agriculture

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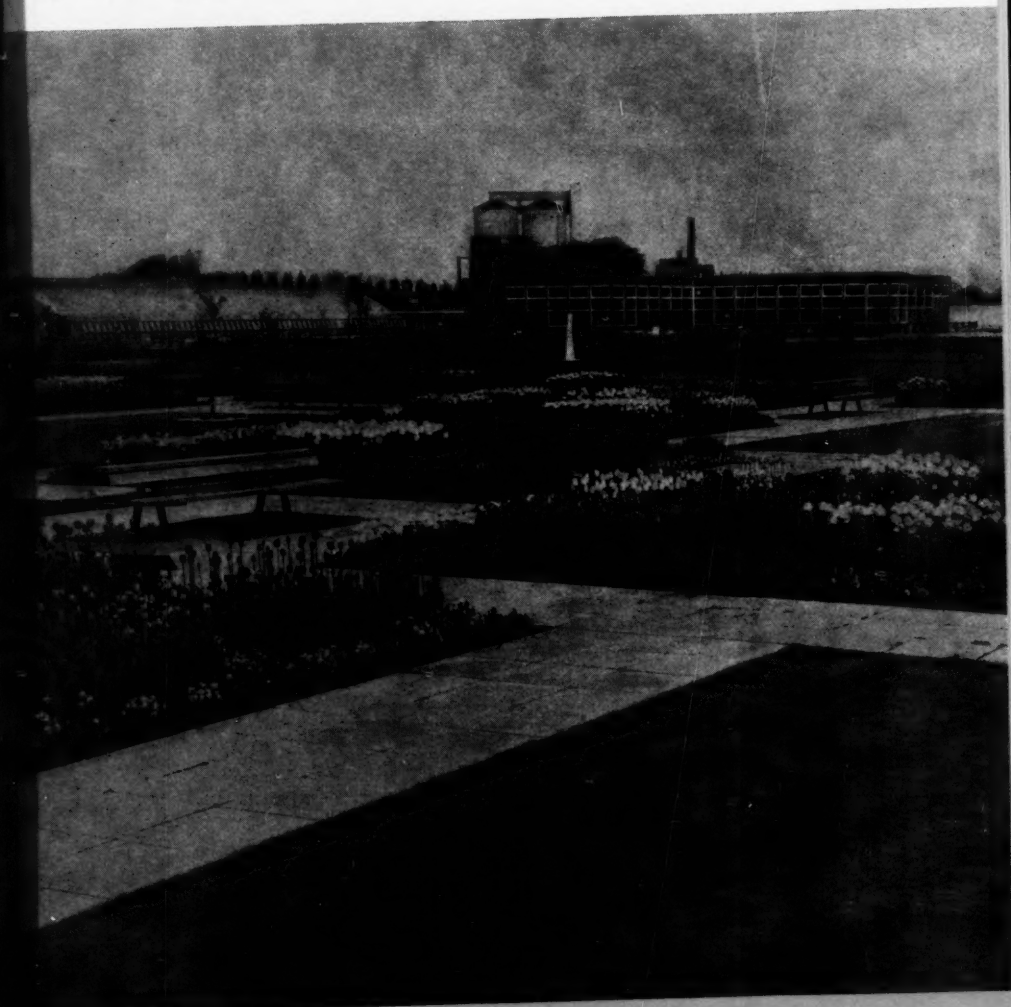


OFFICIAL APPOINTMENTS

General agriculturists and agricultural specialists of many kinds are frequently required in the effort to match the large demand from the developing countries. The vacancies advertised below are a selection from the many openings which exist now. While they are being filled, other vacancies are arising.

Salaries within the ranges quoted are assessed on qualifications and experience; and the terms of most appointments include free or subsidised accommodation, education grants, family passages, good leave on full pay, etc. A contributory pension scheme is available in certain circumstances.

Most appointments are limited to candidates who should be citizens of, and normally resident in, the United Kingdom.

BRITISH SOLOMON ISLANDS PROTECTORATE

Agricultural Officers

RC 213/27/04

Required for extension work, in crop and animal husbandry.
Qualifications: A degree or diploma in agriculture, preferably with experience in tropical agriculture.
Salary: A$1,944—A$4,272 (£ Sterling 778—1,709) p.a. plus an inducement allowance normally tax free, in the range £624—£1,160 p.a., payable direct to the officer's home bank account. Gratuity 25%. Contract 2 years.

THE GAMBIA

Stored Products Officer

RC 213/68/06

Duties: To examine post-harvest field and storage problems of groundnuts and important food crops such as rice and to determine their solution; to organise the produce inspection service relating to quality control in export crops; to train junior staff and give specialist advice.
Qualifications: A degree in Natural Sciences or Agricultural Science with considerable post-graduate experience in stored products entomology. A knowledge of general pest control methods for tropical agricultural and horticultural crops is desirable. Tropical experience advantageous.
Salary: £ Sterling 720—1,524 p.a. plus a tax-free inducement allowance in the range £ Sterling 672—900 p.a. Gratuity 25% of basic salary plus inducement allowance. Contract 2 tours of 15—18 months.

MALAWI

(1) Agricultural Officer (Training)

RC 213/134/029

Duties: To set up and run a training unit, to establish training courses for farmers and staff and to administer and assist a small extension aids unit in the production of teaching materials.
Qualifications: A degree in Agriculture with experience in training of farmers and technical staff and in the growing of maize, groundnuts and tobacco.

(2) Agricultural Officer (Land Use)

RC 213/134/027

Duties: The survey, design and layout of soil conservation works, land use classification and farm planning, and the training of junior staff.
Qualifications: Degree in Agriculture or related subject, preferably with experience in land use planning and conservation in tropical countries.
Salaries: £1,420—£2,600 p.a. In addition a supplement of £100 p.a. is payable direct to the officer's bank account outside Malawi and Rhodesia. Tax free gratuity 15%—25%. Contracts 2—3 years.

OFFICIAL APPOINTMENTS

MONTSERRAT

(1) Horticultural Agronomist

RC 213/114/02

Duties: To advise on a programme of field trials with horticultural crops and on sound development and planting programmes in conjunction with the Marketing Adviser, with whom he will work as a team, and to train and assist local staff.
Qualifications: A degree in Horticulture or Agriculture, with experience in tropical horticulture and training in biometrics.

(2) Marketing Adviser

RC 264/114/01

Duties: To work with the Horticultural Agronomist in advising the Government on the economic and marketing factors with special reference to the requirements of new markets; to advise on the development of markets, organisation of production in terms of quality and quantity; to advise on training for the implementation of a marketing programme.
Qualifications: Purchasing officer with commercial organisation in the U.K. dealing with vegetables.
Salaries: £2,000—£2,750 p.a. subject to British Income Tax plus a variable non-taxable overseas allowance of £445—£1,095 p.a. according to marital status. Contracts 2 years.

ZAMBIA

(1) Animal Husbandry Officer

RC 213/132/023

Duties: To plan and promote the development of the animal husbandry industry, to train extension staff in production and management practices and manage pilot ranching schemes.
Qualifications: Degree in Agriculture with experience in animal husbandry work.

(2) Planning Officers

RC 213/132/05

Duties: To take charge of field planning teams and to be responsible for regional conservation planning on a catchment and/or settlement plan basis.
Qualifications: Degree in Agriculture or Natural Science, preferably with relevant post-graduate training and/or experience.

(3) Agricultural Officers (Training)

RC 213/132/022

Duties: To direct and organize staff training and short courses for farmers at farm institutes and farm training centres.
Qualifications: Degree in Agriculture with experience of advisory work.

(4) Agronomists

RC 213/132/07

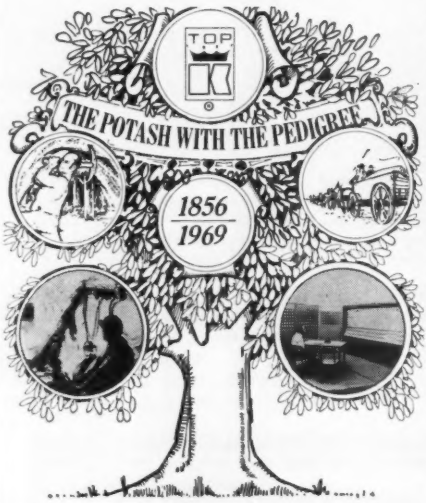
Duties: To work at a regional experimental station and be responsible for programmes of research, collaborating with extension staff.
Qualifications: Degree in Natural Science, preferably with experience in field experimental work.

Salaries: (1), (2) and (3) Kwacha 1,944—4,464 (£ Sterling 1,134—2,604) p.a. (4) Kwacha 1,944—4,344 (£ Sterling 1,134—2,534) p.a. plus an inducement allowance in the range £243—£429 p.a. A supplement ranging from £233—£291 p.a. is also payable direct to an officer's bank account outside Zambia. 25% gratuity. Both supplement and gratuity are tax free. Contracts 3 years.

If you wish to apply for any of these appointments, or you are interested generally in an appointment overseas, please write giving your full name, age and brief particulars of your professional qualifications and experience to the:

Appointments Officer
MINISTRY OF OVERSEAS DEVELOPMENT
Room 330a, Eland House, Stag Place,
London, S.W.1.

MINISTRY OF OVERSEAS DEVELOPMENT



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J.G.S. & Frances Donaldson in association with Derek Barber

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Lord and Lady Donaldson are well known for their work in farming. Derek Barber has been Chief Advisor for Gloucester for many years.

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Agriculture

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HMSO

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AGRICULTURE APRIL 1969

The Agricultural Land Service has given close attention to the use of work study in agriculture over the last ten years, particularly with farm buildings. This article discusses its application and where it is most profitable

Work Study in Farm Buildings

C. Robinson

What work study is

Mention work study in any company and the reaction ranges as a rule from mild interest through scorn and sarcasm to downright vigorous condemnation. In this way the technique of work study suffers from the image created long ago and embodied in the evocative expression 'time and motion'. The picture conjured up by these words is generally that of eagle-eyed morons armed with clip board, pencil and stop watch whose sole object is to secure more and more work faster and faster with regard only for greater profit and with no thought for the workers. This is a pity, for although work study offers the simplest, quickest and often the cheapest method of improving productivity, there can be no success without co-operation between management and workers. Furthermore, management and workers can apply the technique themselves in a rudimentary form.

Work study is not confined to human effort, though human well-being when at work is fundamental to the technique. Machines and particularly working conditions, are given the closest examination to find opportunities for improvement. From this it follows that the method of working is of the greatest importance, and for that reason a method study offers the most fruitful prospect of beneficial changes. Time is of less importance, particularly in agriculture, and time studies, except in broad elements measured by fractions of an hour rather than in fractions of a minute, have little to offer. Logically, if the method is right time takes care of itself.

Where it is most profitable

The technique is most profitably employed upon tasks which are repeated frequently and regularly. Milking is a first-class example. The reason is plain. If a piece of work occupies only a small number of man-days a year and is repeated at about twelve-month intervals then there is little scope for effort-saving. Work study should therefore be applied to tasks involving high or regular labour inputs where the method of working can be turned into a habit requiring little thought or concentration for its accomplishment. In and around farm buildings is a fruitful area in which to employ work study techniques. That is where most labour is used and where repetitive operations occur.

How it is applied

A method study comprises the observation and recording of what is actually happening, followed by a logical and critical examination of the record. The record must be precise and factual and must cover what really happens and not what somebody says is happening, or, what is worse, what somebody thinks should be happening. The outcome of the critical examination will then be based on facts and will almost always lead on to a better method of working.

This critical examination is not carried out haphazardly. There is a well established and soundly based logical system to be followed. It begins by asking what is achieved and goes on to consider where, how, by whom and why. It ends by deciding what else should be done and by whom and why. The evaluation is completed by costing any changes suggested and by computing the gains to be made. All work study investigations can be translated into money terms and so their value can be judged by all concerned in deciding upon the adoption or rejection of the findings. This is one of the strengths of work study.

Indiscriminate use of the technique should be avoided. Indeed, selection of fruitful areas to study is in itself a task calling for sound judgment. The work to be studied must offer scope for savings in manual effort, the prospect of better machine utilization and, if possible, an opportunity for skilled workers to exploit their skill to the full instead of dissipating their energies upon needless tasks. To work study practitioners this will seem an oversimplification but it briefly explains the importance of selection in applying the technique.

When it is applied

A good time to apply method study in farm buildings is when changes to buildings are contemplated or when additional ones are to be erected. Another time is when labour demand is greater than supply or threatens to be so. An important point to have always in mind is that a building is a means to an end and not an end in itself. The operations within or around a building represent continuing labour demand and costs of production. That is where savings can generally be made and yet all to often a new building may be decided upon to secure improvement when improved methods in existing buildings may produce comparable benefits at less cost or even at no cost at all.

Why it is applied

Why bother with work study? The short answer is to make work more congenial and, wherever possible, to reduce costs of production. The opportunities in this direction are far greater than are generally realized. A careful study of any work will show that this is so. Management and labour combining in a study should be able to make improvements even without formal training, although a thorough study requires trained expertise.

A.L.S. and work study articles

The Agricultural Land Service has for the past ten years given close attention to the use of work study in agriculture, particularly in regard to farm buildings. Within the A.L.S. are twenty-five fully trained staff and many investigations have been undertaken. All professional staff have had a short theoretical and practical course to help them in their advisory work in farm buildings.

In forthcoming issues of *Agriculture* members of the A.L.S. will contribute articles dealing in more detail with the application of work study to dairy buildings and pig buildings.

This article has been contributed by **C. Robinson, F.R.I.C.S., A.A.I.,** who is Regional Land Commissioner at the Eastern Regional Headquarters of the Ministry.

"Profitable Farm Enterprises"

A New Series of Ministry Booklets

Improved farming techniques developed on the Experimental Husbandry Farms of the Ministry of Agriculture, Fisheries and Food are described in a new series of free booklets for farmers called 'Profitable Farm Enterprises' introduced recently.

The new booklets, produced by the National Agricultural Advisory Service, explain how the new and improved techniques developed, tested and proved on the Experimental Husbandry Farms can be built into commercial farming systems and can help to increase profits. They bring together all the findings from work done on the experimental farms which relate to a particular commodity and will encourage quicker adoption of new methods.

It is intended to issue about ten of these publications. The first two are:

"Rearing Friesian Dairy Heifers for Autumn Calving"
Over 800,000 dairy heifers are reared in England and Wales every year. With traditional systems of management, each would use about two-and-a-half acres of land from birth to calving. By following the techniques described in this booklet, this area can be reduced to one acre and, as a result, there will be a significant improvement in the overall profitability of the farm. In many locations the acres saved will be available for cash crops; in others producers may be enabled to expand their dairy herds.

"Three Systems for Beef using Dairy Calves and Grass"
Improving the profitability of beef production can be achieved by applying present knowledge of growing, and utilizing intensive grass by cattle and by incorporating into the system some of the modern techniques of rearing calves and of finishing cattle developed initially for intensive cereal/beef units. From the fusion of these techniques, three systems for beef using dairy calves have resulted, for autumn, winter and spring-born calves respectively. Each is described in detail. They all make maximum use of intensive grass and show how, depending on what resources are available, the correct choice of system can be made by an individual farmer. Whichever system is chosen, beef production can become a highly profitable enterprise in its own right, not only in pre-dominantly grassland areas, but also as a means of making advantageous use of the grass break in arable situations.

Springfields

A showgarden for British bulbs — its origin, organization and success

Jean Pamley

THE leading spirits behind the creation of Springfields had, for some time, felt that the expanding British bulb industry should move into new spheres of marketing and research. They felt that there should be a base from which new markets could be developed and where investigations into consumer choice in bulbs could be carried out. They wished to provide the bulb trade and the bulb-buying public with a reliable source of information on matters of variety, quality, culture and performance. It seemed that a show garden would best suit their purpose and so they set out to create one.

Naturally, this was not achieved overnight and it was not until the winter of 1963/64 that a potential site was found at Fulney, a mile east of Spalding on the A151. The site consisted of 20 acres of good sandy loam farmland, with a pH of 7·0, which had been used for arable cropping. It was known that the site would become vacant at the end of 1963 and the Executive Committee of the South Holland (Lincolnshire) Horticultural Association, which is a specialist branch of the Holland (Lincs) County Branch of the National Farmers' Union, invited Mr. Carl van Empelen, one of the foremost landscape architects in Europe, to visit Spalding to assess the possibilities of the site. After his inspection Mr. van Empelen agreed that the site was suitable for the purpose in mind and early in January 1964, the crucial decision to set

about the formation of a show garden was made by the Horticultural Committee.

The Spalding area has the unique advantage of having been known for many years as the centre of the British bulb industry. Some hundreds of thousands of people visit the district over the four weeks the tulips are in bloom—a quarter of a million are estimated to attend over the weekend of the annual Flower Parade—and it was hoped, therefore, to attract a great many of these to the new venture.

In order to retain control of the enterprise the Horticultural Committee set up a company in April 1964, Publicity for British Bulbs Ltd, and nominated seven directors to form a Board. This company owns the property and is responsible for the provision of all items of capital equipment, which remain their property. In April 1966, another company, The Springfields Horticultural Society Ltd., was set up and is responsible for the day-to-day administration of the garden throughout the year. The Council of the Society is responsible for the overall running of the garden but there are, of course, other committees dealing with specific subjects. The Springfields Horticultural Society Ltd. was registered as a charity at the end of 1967.

Although the decision to go ahead with the project had been taken, there remained the problem of finance. It was estimated that the initial development would cost about £50,000 with a further £20,000 for buildings and glass. Due to some alterations to the original scheme and the rising costs of materials and labour, the initial development cost in the region of £80,000, and buildings and glass approximately £50,000.

The Agricultural Market Development Executive Committee were sufficiently impressed with the merits of the enterprise that they awarded a grant to the extent of 25 per cent of certain expenditure to a maximum of £12,000. A substantial sum of money was loaned by growers and members of the industry and ancillary trades, and gifts in kind and in cash were made by several generous donors.

Work on the site began in October 1964, by reshaping the contours in accordance with Mr. van Empelen's design. From the beginning the weather was against the project; much of the land was waterlogged for part of the time and the heavy machinery, necessarily used in the levelling, churned up subsoil. In its turn this brought difficulties in laying the foundations of the roads and the slabbed areas, and it also held up the preparatory excavations for the proposed lake. The abominable conditions also caused difficulties with the laying of the butyl rubber lining for the lake. The soggy ground failed to hold the rubber sheets in position, with the result that leaks appeared in the lining. The lake had to be emptied by the fire brigade before the butyl sheets could be relaid.

In early 1965 snow delayed the planting of thousands of trees and shrubs and frost killed some of the trees, including an avenue of silver birch. At one time the flower valley was a miniature lake and a minor whirlwind brought down the pillars on the restaurant terrace.

Difficulties seemed endless and it was only by the prodigious efforts of the many people concerned that the garden was completed on time and opened to the public in April, 1966, under the name of 'Springfields'.

Springfields has been laid out as a formal garden and the initial planning provided for: 25,000 sq. yd of lawn; 2½ miles of paths and roadways; 8,000 sq. yd of paved area; 15,000 sq. yd of shrubs, plants and trees; a lake covering

3,000 sq. yd of water and holding a million and a half gallons; 1,284 yards of fencing; 30,000 trees, shrubs and plants, and over one million bulbs.

In accordance with the original intention that Springfields should be a shop window for British bulbs, the garden provides fifty exhibition plots ranging in size from 33 sq. yd to 644 sq. yd and these are let out, without rent or levy, to growers, wholesalers and retailers. In their plots the exhibitors show as wide a variety of bulbs as they can and the plots also give the public some appreciation of the colours, variety and durability of the flowers on show.

There are more than 3,000 different varieties of bulbs planted in the garden and exhibitors also provide over 300 varieties of tulips planted in the glasshouses, which cover nearly 10,000 sq. ft.

Many different varieties of narcissi, which were presented to Springfields by the Daffodil Society and planted in the form of trial grounds, provide a very interesting feature of the garden for narcissi enthusiasts.

Added to the original design is a Collector's Corner where over 400 different varieties of tulips have been planted for close study and appreciation. A large number of these varieties were given to Springfields by the National Agricultural Advisory Service and there are many old varieties to be seen in the collection.

Experienced staff are on hand to answer visitors' questions, and catalogues and order forms are available at the information centre where the public may order bulbs for future delivery.

For the convenience of our visitors we have added various amenities: a garden centre, a souvenir shop, photographic kiosk, a refreshment room for light refreshments and a first-class restaurant. There is free parking space for 5,000 cars. The admission fee into Springfields is 5*s.* per adult and 2*s.* 6*d.* per child or pensioner, with reduced rates for parties. Wherever possible the amenities are run by concessionaires so that as many organizations as possible benefit from this venture.

It was considered desirable to have an historical film despite the shortage of finance and we were fortunate enough to discover a local amateur film-maker of international reputation. A 16 mm. film was commissioned showing the development of the project under the title of 'The Story of Springfields'. We had the inestimable good fortune to secure the services of James Robertson Justice, who gives the commentary for the thirty-one minute film. A second, shorter film, was made earlier this year entitled 'Springtime at Springfields' and this takes the viewer on a tour of the garden at its peak in the third season.

Springfields is essentially a spring garden and is therefore only open for a relatively short period each year, at the most eight weeks and at the least six weeks each spring. Since opening on 6th April, 1966, the garden has been open to the public for a total of nineteen weeks, and during this time almost 400,000 people have visited Springfields, people come not only from the British Isles but from many parts of the world and, in fact, when overseas people are visiting Britain many plan their tour to coincide with the opening of Springfields.

From a survey it would appear that the public attracted falls into two main categories: (1) those interested in gardens and gardening, often under the auspices of a Horticultural or Garden Society, and (2) the type who had previously visited the area and who looked for a sheer spectacle.

It is probable that category (1) would be the more ready public for the sale of British bulbs, although it is obvious that there is a considerable percentage amongst category (2) who could be interested after being exposed to the versatility and usefulness of bulbs both in house and garden. It is of interest that representatives of exhibitors tend to be more successful with sales on weekdays to members of category (1) than to the much larger numbers of visitors at weekends, most of whom probably fall into the second category.

When Springfields opened to the public in April 1966, the long-standing aspiration of the British bulb industry was fulfilled. The sponsors of Springfields are gratified by its obvious success and it may be possible in the not too distant future for the garden to be extended by a further ten acres.

The Common Market

Producer Associations in the E.E.C.

R. C. Rickard, *Department of Agricultural Economics, Exeter University*

FARMING, in the European Economic Community as elsewhere, is faced with the necessity of adjusting the production and sale of its products to the requirements of a demand which is undergoing a rapid process of concentration. The need to offer large quantities of goods of a quality guaranteed by the supplier and to ensure a continuous, often date-tied delivery to the trade and the manufacturers, require new forms of organization in an agriculture which is characterized by a predominance of small units. Seventy per cent of the farms in the E.E.C. are under twenty five acres in size. This fragmentary supply of agricultural produce is hardly likely to meet future market requirements which call for high-quality products and a regular flow of fresh food throughout the year.

Last year a draft regulation relating to syndicates or associations of agricultural producers was submitted by the Commission to the Council of Ministers, but this is not yet in force in the Community as it has not

yet been approved by the Council. It is designed to create a Community framework within which member states can introduce measures to encourage the formation and development of such organizations. The regulation is not intended to set up producer associations that will take the place of existing organizations but rather to establish a set of common rules which will enable both old and new forms of association to develop side by side.

In the view of the Community authorities, the main weakness of the traditional agricultural marketing co-operatives is that, because of a lack of loyalty on the part of their members, they have been unable to build up a marketing strength commensurate with the number of their members. This weakness is removed by the Commission's proposal that, although membership itself is voluntary, members are nevertheless required to enter into contracts and to market all their entire production of a particular commodity through the association. If dealers and co-operatives wish to assume the functions of a producer association, they will no longer be able to confine themselves to purely commercial activities but, along with the newer forms of organization, will impose a common discipline on their members in directing production and taking responsibility for standards of quality. Indeed, this is considered to be their prime purpose and an important means of achieving the objectives of the common agricultural policy of the E.E.C.—the stabilization of markets and the guaranteeing of regular supplies at reasonable prices to consumers.

Promotion measures

An important aspect of the Community's intention regarding agricultural producer syndicates is that each member state is free to allow for the special features of its own agriculture and the particular needs of certain regions or particular crops. Thus the farming community is given considerable freedom to improve the organization of its production and the marketing of its products.

In order to encourage the introduction of producer syndicates, member states have the power to give them financial assistance during the development stage. There are two kinds of aid—initial and investment. The former is an operating subsidy. For the first, second and third years, assistance is up to a limit of three, two and one per cent of the value of produce marketed during the first year of operation. The second, investment aid, consists of capital grants. During the first five years of operation, grants may be given to assist investment aimed at improving the conditions of production and sale (storage, grading and preparation for sale, for example). For the construction of new buildings, and the extension and modernization of existing ones, the maximum grant is forty per cent of cost; an upper limit of twenty per cent is allowed for machinery, equipment and vehicles.

These funds are to be furnished solely by the member state. For the future, however, it is probable that assistance will be available from the Community's Agricultural Guidance and Guarantee Fund under other headings, such as the improvement of the structure of agricultural markets.

Recognition

Particular importance is attached to the 'recognition' of producer syndicates. Recognition is not a matter of legal constitution or of membership.

The syndicate can be based on a producer co-operative, livestock dealer, food processor or feedingstuffs supplier. The exact legal status can be optional, too. It can, for example, be a limited company, a formally constituted co-operative or a registered producer association. The criteria for recognition are the production and preparation of a collective offer for sale of a commodity which can be marketed through one or several intermediaries. The syndicates may, if they choose, engage in processing or marketing activities beyond this first stage but such functions are not recognized and do not benefit from any special advantages in the form of financial assistance.

In more precise terms, the conditions for recognition include: the adoption of common rules for production and sale, at the first stage of marketing; the obligation of members to have all their production of a particular commodity sold by the syndicate; the exclusion of all discrimination, either by producers or buyers, based on nationality or place of establishment; above all, the formation and operation of a syndicate must not jeopardize the objectives of article 39 of the Treaty of Rome. Among such objectives is that of ensuring 'reasonable prices in supplies to consumers'.

It seems, then, that the Community authorities do not wish to encourage the development of farmers' organizations with monopolistic powers which might be used in a manner contrary to the spirit of free competition envisaged in the Treaty of Rome. It is therefore specified that membership must be voluntary and that, normally, no syndicate should market more than five per cent of total Community production of any commodity. If a syndicate or a combination of syndicates does control more than five per cent, then it must be subject to special recognition by the Commission. This proposal has been the subject of much controversy and there have been suggestions to make the '5 per cent' rule for specific commodities more flexible.

The list of commodities for which syndicates may be formed includes all products that may be sold by an agricultural enterprise apart from fruit and vegetables. It even contains products grown in French territories overseas.

Fruit and vegetables

Horticultural producer syndicates dealing with fruit and vegetables are covered by special provisions which are already in force. Their scope is much wider than the provisions for agricultural producer syndicates. For some horticultural products, the E.E.C. market regulations need officially constituted producer associations to implement price support operations. These include the imposition of quality standards and intervention in, and withdrawal from, the market at periods of low prices. The formation of such organizations will be assisted by direct grants shared equally between member states and the guidance section of the Community's Agricultural Guidance and Guarantee Fund. (A previous article on the fruit and vegetable arrangements in the Community was included in an article by G. W. Ford in the October, 1967, issue of *Agriculture*.)

The market intervention process, in which producer associations participate, consists of three main stages. The first is left to the producer association which can fix a buying-in price—up to a maximum determined by the

member state—below which members' produce is withdrawn from the market. Such intervention must be financed from levies on members' sales. Thus producers insure themselves against low prices.

Should this first stage fail to steady the market, member states may intervene. For a given commodity the Commission fixes annually a basic price which is normally the arithmetic average of market prices in the main areas of surplus production in the preceding three years. A buying-in price is then derived from this basic price. Until the end of 1969, the buying-in price must not exceed 70 per cent of the basic price. If market prices are below the buying-in price plus 15 per cent of the basic price for three consecutive days, a 'state of crisis' is declared. Producer associations can intervene in the market and be compensated up to an amount not exceeding 90 per cent of their total expenditure on the operation. A return to pre-crisis levels of market prices brings this form of support buying to an end.

However, a 'state of serious crisis' is declared if prices continue to fall and remain below the buying-in price for three consecutive days. Then member states may intervene on the market and must accept at the buying-in price all produce of E.E.C. origin, conforming to Community quality standards, offered to them.

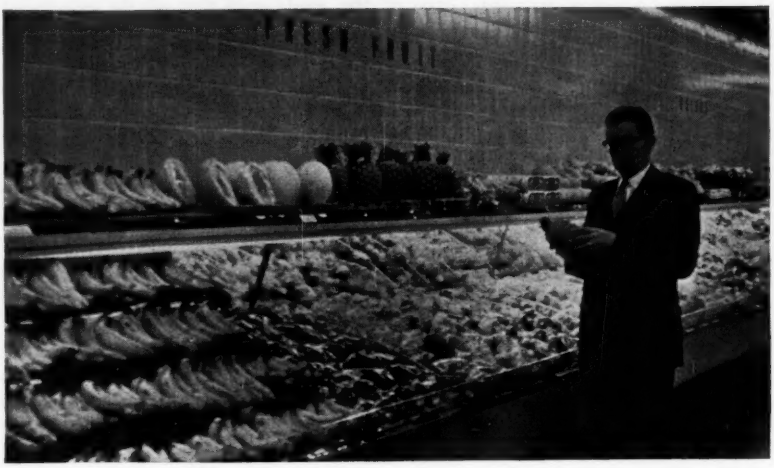
General

The concept of agricultural co-operation has been considerably widened since the nineteenth century when the co-operatives made their appearance in the face of grave agricultural crises brought about by the uninhibited functioning of economic liberalism. At that time it was accepted that governments should not intervene in the economic sphere, and association and solidarity emerged as the only means of protection to agriculture. We are now witnessing a rapid economic, technical and social evolution in European agriculture. Inevitably the problem arises of how far the present structure of agricultural co-operation will meet the needs of a competitive European market economy.

Many factors are likely to influence, the general development of agricultural co-operation. For instance, the structure of farming is changing and national markets are becoming increasingly open to one another within the E.E.C. There is also the attitude of the rising generation of farmers towards co-operation. A short while ago, it seemed that many young farmers might be hostile to co-operation but recently there has been a more positive approach and an emergence, alongside the traditional co-operatives, of newer, more audacious forms of association. Finally, there is the legal structure of agricultural co-operatives which varies widely from one member state to another. One of the major causes of diversity within the E.E.C. has been the attitudes of individual governments. In this respect, there is probably no greater contrast than that between the complete liberalism of government policy towards agricultural co-operatives in the Netherlands and their close supervision in France.

An article, **Producer Associations in France,** by R. C. Rickard, will appear in a future issue of *Agriculture*.

Are growers producing the right quality product at the lowest possible cost to meet the housewives' demands at the self service store? Mr. H. Haslam of Messrs. J. Sainsbury Ltd., discusses the revolution in demand and the necessary co-operation and continuity needed for it to gain momentum



Producing for the Consumer

A hundred years ago, J. J. Sainsbury and his wife opened a dairy in Drury Lane. Today, still a family business, the company has an annual turnover of over £150,000,000 through 250 branches, of which currently 100 are modern supermarkets.

The branches are located in the southern half of England within a radius of about 120 miles of London. The policy is to deliver fresh perishable foods daily to every one of its branches.

With the opening of two modern distribution depots, the first in Basingstoke, Hampshire in 1964 and the second in Buntingford, Hertfordshire in 1966 as part of their major decentralization plan, Sainsbury's area of operations has widened. However, the replacement of old counter service shops with modern supermarkets has a very high degree of priority in Sainsbury's immediate plans for expansion. The produce department operates from its own warehouse in Hoddesdon, Hertfordshire. A further distribution depot is in process of construction in Charlton in South East London.

THE quiet revolution in the distribution of horticultural products started little more than a decade ago when the big grocery chains began to take a serious interest in selling fruit and vegetables, but before they understood the

vagaries of this particularly difficult trade they themselves became caught up in supermarket development. So it really was a quiet revolution, so quiet, in fact, that few people in the fruit and vegetable industry realized that it was taking place. Although it has experienced many difficulties, it is now gaining in momentum; the very few companies involved in supermarket development are taking an ever-growing share of the trade and the whole system of distributing produce is undergoing change.

The success of the supermarket industry stems from the introduction of self-service shopping and has been described as the profitable mass movement of goods. Ten years ago there were, in Britain, 175 supermarkets (self-service food stores with a selling area of not less than 2,000 sq. ft); there are now around 3,000, an increase of a new supermarket every working day. This rate of building is still continuing and the individual stores are getting bigger (in the case of J. Sainsbury Ltd., the stores opening this year are on average twice the size of our present average self-service stores), and it has been forecast that in a few years time 60–70 per cent of the grocery trade will be done by supermarkets. This development means that more and more housewives will be visiting supermarkets and will therefore be brought into supermarket produce departments constantly. If the produce trade of the supermarket is handled properly an increasing percentage of fruit and vegetable sales of the country will be made through these outlets, a dwindling amount by the wholesale markets and traditional greengrocers. However, for this to happen, the standards of quality must be improved in supermarkets. With such potential why is so much produce in them sold by counter service? why has it not followed the pattern of all other foodstuffs in supermarkets and become a self-service department? Why build self-service supermarkets (where the turnover per foot should be at least five times that of counter service and where the free flow of shoppers is so vital to successful business) only to 'bottle up' the customers at a counter service produce department or have them turn away at this point?

The multiple food shops had avoided selling horticultural products because of the dirt, waste and the amount of physical handing required to sell it, but, in the drive to 'one-stop shopping', the customers' fresh fruit and vegetable needs must be catered for.

Many people concerned with the development of supermarkets ten or twelve years ago have been disappointed that the swing from traditional retailing of produce has not been very much quicker than it has. In fact, no department of food retailing made more mistakes or moved more slowly than the produce department in supermarkets during the early years. Initially, this was due more to the supermarket operators' failure to appreciate the problems of the trade, than to any fault of the few enthusiastic growers who were taking an interest in pre-packing fruit and vegetables for the first time. In the main, the supermarket people failed to understand that the breathing products of this department could not be treated like tins of beans and bottles of sauce, but needed specialist treatment even more than their other 'perishable' departments. Very much less did they realise that various commodities within the department required different treatment from each other. A great deal of research was necessary to find the right films and other packaging materials, whilst good produce was put into the wrong materials and held too long at wrong temperatures by untrained staff at store level. Little wonder that the public began to distrust pre-packaged produce which lost texture and flavour as it developed bacteriological breakdown, or that a

good many of the early pre-packers decided that their future did not lie with the chain stores. The restrictive counter service produce department came from an inability (for the above and several other reasons) to supply the customers with the quality of greengrocery they expected from reputable stores. This need no longer be the case. Most supermarkets could have self-service produce departments if the produce which has been pre-packed under strict quality conditions, either centrally or by the grower, is stocked carefully and handled correctly at the store level.

The industry as a whole has failed to come to grips with the true meaning of 'quality'. It is probably the most misused, abused term in the trade. Having regard to the sales potential and the developments of the past few years, the supermarkets should offer the housewife fruit and vegetables so compellingly fresh that she cannot resist buying, but if they don't she will certainly turn to 'convenience foods'.

Sainbury's Produce Department is 100 per cent self-service and as far as possible the pre-packing is carried out by the supplier. Our first requirement is that whatever is pre-packaged is to a standard of quality agreed between our buyers and the producers, and samples are received and examined before purchases are made. After ten years we would like to have been able to say that our producers and their employees are so reliable that we do not need to exercise quality control at our central produce warehouse but, unfortunately, this is not the case and until stronger quality control is in operation in the packhouses we need teams of men on quality control for sixteen hours per day. We assist the producer in many ways in getting the required quality, and reserve the right to reject any pre-packaged goods which do not come up to the standard.

Every Sainsbury store selling produce has a delivery of fresh goods each morning at 7.30 a.m. and some of the larger shops have a further delivery of produce about midday. The housewife now expects to find in the department any item of fruit and vegetables she needs, everything in season, and also a number of items which are not and which have to be brought by air across the world. The department generally has available between 70 and 90 items of produce by pack size or varieties at any time of the year. Knowing that what she needs both in variety and quality will be available, the housewife becomes a regular customer and it is customer loyalty which is a vital necessity for the planned stocking of the shops. Knowledge of our sales potential enables us to come to long-term arrangements with suppliers, to plan in close co-operation with them and they are better able to give us continuity.

For a long time the pattern of distribution of fruit and vegetables has been for the grower to produce certain crops, which he has sent to the markets of his choice. Very often he has sent to several wholesalers on a commission basis, accepting his returns, together with the advice of the salesmen for the reason why the "account sales" are good or bad. This advice frequently related to a single day's market and was hardly enough to encourage a grower to change a variety for quality reasons or to plan his next year's work. There has been little planned marketing in the industry and market research has been almost non-existent. This has resulted in growers producing crops with an eye on the biggest yield, or earliness of harvesting or similar reasons and not with the main decision in mind as to what the housewife wants, if indeed this was considered at all. Sometimes, perhaps, too much stress is placed on the importance of yields in plant breeding and production work—neglecting flavour, size and shelf life—which mean quality to the consumer. A variety

selected for yield, but with a sacrifice of quality is harmful to our joint interests, and knowing that these conditions exist and not doing anything about it is worse than not knowing at all. By self-service sales we are able to find out a great deal about the housewife's demands and preferences.

We obtain seed for experimental work from all over the world and have experimental crops growing in several counties in southern and eastern England. We are also able to call upon our scientists for experiments in preserving and storing, and our equipment buying, transport and warehousing departments have a great deal of information available which can affect the economies of our suppliers and save them a great deal of time and trouble searching out the best piece of equipment for their businesses. All our producers are visited regularly by service departments of the company and with grower co-operation we should offer the customer the quality and continuity which will gain her loyalty, thus enabling us to expand our purchases from the growers.

The whole industry will grow and prosper if it understands its customers' demands and makes every effort to bring to those customers the finest possible product at the lowest possible cost. When, some time ago, one of our larger suppliers said, 'If we cheat your customers, we are cheating ourselves' it was felt that the revolution was indeed gaining in momentum.

Featuring Food in April

April brings with it the first of new season's home-grown produce to prove that spring has arrived and summer is on the way. Among the arrivals in the shops are English lamb, tomatoes and radishes; there might even be a few peas towards the end of the month, so tender they can be eaten pod and all.

April also brings with it the Easter holidays, when many families take their first real break of the year. Open-air vacations, in tents, caravans with plenty of picnics, are popular if the weather is kind. Luckily, there is quite a range of saladstuffs to make catering for outdoor as well as indoor meals easy and not too expensive. Lettuce, cucumbers, beetroot, watercress and salad-cress—all easy to pack, excellent with cold meats, hard-boiled eggs or with cheese.

Again, cold, easily-prepared meals are simple, but for those who prefer hot fare, the cheaper cuts of beef lend themselves well to casseroles and stews, dishes that can be left to cook by themselves in a slow oven while the housework is done.

April is a fickle month from a weather point of view and it is a little difficult for growers to know for certain which of the young crops will be ready for picking. Housewives still have to rely to a large extent on winter crops or foods from store. There are plenty of cooking apples to be had, and these should help, with rhubarb, to provide ideas for desserts until the summer soft fruits come along.

The possibilities of an intensively run sheep enterprise are discussed by the Deputy Director of Rosemaund Experimental Husbandry Farm

An Intensive Sheep Enterprise

F. J. Round

A SMALL flock of sheep kept as 'scavengers' makes a useful financial contribution to many farms. This was true at Rosemaund where for many years a few sheep proved useful in grazing young orchards and around experiments where cattle grazing would not have been convenient. Can sheep, however, merit consideration as a main enterprise on a lowland farm? To answer this question an intensive experimental sheep unit of 300 Welsh Half-bred ewes has been established at Rosemaund, using a paddock-grazing system and based on fat lamb production.

All of Rosemaund's 435 acres are on heavy land which tends to lie rather wet in winter and is prone to poaching. In the past, sixty ewes wintering over almost 200 acres of grass have presented no problems—in fact, they have probably had a beneficial effect upon the grassland. Sheep kept at four or five ewes per acre over the winter period were, however, presenting considerable difficulties, and so work was started in looking into the problems of housing ewes during the winter and also the effects of winter stocking on our heavy land pastures.

Wintering ewes

Much has been written about housing sheep during the last few years. Work at Rosemaund confirms that inwintering is a convenient system, providing the shepherd with easier working conditions and no additional hazards to those he would normally encounter on an outdoor system. The health of the ewes has remained good during the last seven inwintering seasons, but in terms of extra performance it has not been possible to show any advantages as far as the ewe herself is concerned.

The cost of a sheep house need not be high, and provided that a few basic principles are used, a fairly cheap house, such as the one used at Rosemaund, will prove adequate for the purpose. Twelve square feet of well ventilated but draught free floor area per ewe is ideal and 4–6 in. of trough or rack space along the front of the pen is sufficient for *ad lib.* feeding of roughage, although a minimum of 14 in. of trough space is desirable when concentrates are being fed. The Rosemaund house consists of a pole barn with a single span low pitch galvanized roof. The ends of the building are clad with galvanized sheeting, and a wall of bales, held in place with wire netting, forms the back. There is a 3 ft gap between the top of the bales and the roof. This, together with an open front (except for the feeding rack), allows plenty of air circulation but avoids draughts at floor level. The cost of this building, erected with farm labour, but excluding the feeding racks which were already on the farm, was £1 per ewe housed.

In December, when housing normally commences, the ewes come into their straw littered pens and readily settle down to housed conditions. The ewes have already been introduced to silage during their last ten days at pasture and should be eating about 8–10 lb per head by the time they are housed.

The quality and dry matter of the silage needs to be high to allow the ewe to keep herself in condition. During the last six weeks of pregnancy concentrate feeding (up to 1 lb per head per day) ensures that the ewe is on a rising plane of nutrition during the most critical part of the year.

Inwintering affords the opportunity to rest leys during the winter months. Five years' trial work carried out on both permanent pasture and leys has shown that under heavy land conditions, grazing during the winter (December–February) at only two ewes per acre reduces the available grass during the following spring by about 5 cwt of dry matter per acre. Winter grazed pastures not only produce less in the following spring but are also slower to 'green up' in March, just at a time when this small quantity of grass is so useful in stimulating the milk production of the ewes, thus enabling lambs to get off to a good start.

Summer management

Lambing starts in early March, and with the exception of a few stragglers is normally over by the end of the month. Because the ewes are stocked at a high density in their winter shed it is important to remove each ewe and her lambs as soon as possible after lambing. Putting them into individual pens (made simply with hurdles or even straw bales) for forty-eight hours allows time to weigh, tag and castrate the lambs and also to dose the ewe before they go out to pasture. Using this system, 'mis-mothering' does not become a problem, and the lambs gain strength before facing the rigours of outdoor life. Provided that weather conditions are not too hazardous,

turnout to their summer grazing paddocks does not present any difficulties. Because of the exposed nature of the site temporary shelter in the form of wattle hurdles is provided. In addition, corn feeding is also continued at 1 lb per ewe per day until grass growth is adequate to maintain the milk supply of the ewe. Corn is also used as a carrier for calcined magnesite and the normal practice is to continue corn feeding at a reduced rate of $\frac{1}{2}$ lb per ewe until the main dangers of hypomagnesaemia are over at the end of April.

Paddock grazing

Each of the nine experimental flocks of sheep are managed on a 6-paddock unit with ewes and lambs remaining together until weaning in August. As grass becomes plentiful (in April) paddocks which are not required for grazing are laid up for the main conservation as silage. Flocks on low stocking rates conserve up to half of their paddocks for this first silage cut, while the more densely stocked units, especially in the 'no nitrogen' flocks, may only conserve one, or possibly two of their six paddocks. At all times grazing is given first priority, but enough silage is required from each treatment to make it self-sufficient during the winter housing period.

Since starting this experiment three years ago it has been possible to increase all stocking rates to give a range from 3·5–7·2 ewes plus their lambs per acre and, at the same time, reduce the quantity of nitrogen needed for the systems.

With no nitrogenous fertilizer, relying on high clover/ryegrass swards, stocking rates up to 5·4 ewes are kept. At 90 and 180 units of nitrogen, both applied in four dressings, maximum stocking rates of 6·3 and 7·2 ewes per acre respectively are being obtained. At the high rate of nitrogen, the clover has now disappeared and the sward is almost pure perennial ryegrass. Frequency of moving from paddock to paddock depends very much on seasonal grass but all paddocks have had a minimum rest period of 21 days between grazings. Paddocks which become too strong to graze are taken out for the second silage cuts. This not only augments the main silage harvest in providing all the ewes with winter keep but also aids grassland management and enables the grass to be kept near to its optimum for grazing. Stemmy material or seed heads are removed, as necessary, by topping.

Performance of lambs

During the early part of the season the daily liveweight gain of the Welsh Half-bred × Suffolk lambs has been approximately 0·7 lb irrespective of stocking rate. As the season progresses, however, daily liveweight gain tends to decrease and may be as low as 0·3 lb by July. The aim of this experiment is to sell from each unit as many as possible of the lambs fat, thus enabling the stocking pressure to be relieved as the seasonal grass growth declines. The singles, as one would expect, have outmatched the performance of the twin lambs and are usually the first to go off fat in late June. At this time of the year the lambs will be gradable at approximately 70 lb live weight, but as the season progresses it is necessary to increase the live weight to 80 lb before they have sufficient finish on them to grade.

In 1967 over 90 per cent of the lambs from all stocking rates were sold fat, but in 1968, which was not a good sheep year in the Midlands, approximately

60 per cent of the lambs were sold fat, the remainder being sold as stores at the end of September at an average weight of 74 lb. Gross margins in 1968, calculated on actual prices received for the fat lambs and 1*s.* 6*d.* lb for the store lambs, were £41, £42 and £40 for stocking rates of 5·4, 6·3 and 7·2 ewes at 0, 90 and 180 units of nitrogen per acre respectively. Sales of lambs from the same stocking rates were 656, 717 and 769 lb per acre respectively. The lowest gross margin recorded in 1968 (£20 per acre) was in the flock stocked at 4·5 ewes per acre at 90 units of N. Here an unusually low lambing percentage of 125 per cent reared, compared to the average 150 per cent, considerably influenced the financial result.

At the 5·4 ewes per acre stocking rate with no nitrogen, just enough grass has been conserved to keep the ewe throughout the winter period, but on both the 6·3 and 7·2 ewes per acre treatments, with 90 and 180 units of nitrogen respectively, there is a considerable amount of conserved silage in excess of the winter needs of the ewe.

Health

As already mentioned, the housed ewe flock has remained in good health every winter. It is, however, vitally important during the last 6–8 weeks of pregnancy that the ewes should be on a rising plane of nutrition. This will probably mean that unless the fodder offered is of exceptional quality, an increasing proportion of high nutrient feed (in the form of concentrates) should be used to replace the roughages, and avoid risks of losses from pregnancy toxaemia. Because losses from hypomagnesaemia can be quite serious, calcined magnesite is fed to the ewes from lambing until the end of April. Another problem which is associated with the Old Red Sandstone soils is that of cobalt deficiency. Previous experiments have shown dramatic responses by lambs to cobalt in the July/August period. All the sheep paddocks are now sprayed with $\frac{3}{4}$ lb of cobalt sulphate each season. Since using this technique no symptoms of cobalt deficiency have been observed.

A careful watch is kept for worm problems and drenching is carried out when considered necessary rather than on a routine basis. Fortunately, the use of modern highly efficient anthelmintics makes it possible for the ewes to return to their paddocks on the same pasture each year. Unfortunately, coccidiosis, which is not so easily treated, has appeared in the units during the last two seasons. It is difficult to say how much lamb production has been lost from coccidia. This will be one of the problems investigated more closely in the coming season.

Conclusions

There will always be a place for sheep on lowland farms as scavengers, grazing surplus grass wasted by other forms of stock or in odd corners of the farm not suitable for grazing with dairy cows and perhaps not readily ploughable. From the encouraging results of the Rosemaund Paddock Grazing Units it would appear that lamb production should merit consideration in its own right as an intensive livestock enterprise. Having a gross margin between £20 and £40 per acre, depending on stocking rate, must make the sheep competitors with beef cattle for the use of grassland. It also makes the sheep a 'natural' enterprise to utilize the 'grass break' so often necessary on an intensive cereal farm.

A. LESTER-CARD

discusses the increasing benefits in integration of dairy herds

Co-operation in Dairy Farming

MUCH of the emphasis on co-operation activities so far has been on marketing but this is not possible in dairy farming, where for many years the function has been looked after by the Milk Marketing Board. Any thoughts which farmers have for joint activity must, therefore, settle on production issues where there seem to be a number of opportunities which will improve financial returns or working conditions.

Inevitably thoughts turn to the large units with their proposals for 'Cotels' for three hundred or more cows which, in the long term, may make an important contribution to the dairy scene. There is, however, scope for considerable co-operational activity amongst the small and middle-sized farms which are unable for many reasons to develop 'Cotel' farming. Unfortunately, many of the farmers of these holdings are too occupied to think coherently about joint development; they are too busy with the seven-day week work that goes with their chosen calling and are, in any case, suspicious of proposals which break down their individual control of the business, however small their profits may be. These fears are groundless provided an effective working document, which covers procedures to be adopted in the event of a dispute, is produced at the outset, before there is any committal to working together.

This article examines a number of possibilites for co-operative activity which, although generally applicable to the small and medium sized holdings, can be adapted for use amongst the whole range of the country's dairy farmers.

Shared labour

The primary consideration here is the labour for milking. Most industrial workers in this country now have a five-day week and there is no reason to doubt that farming will eventually follow suit. It could be arranged quite easily for herdsmen. There are many possible permutations but the most likely seems to be where an additional cowman is employed for three one-man herds. To avoid the problem of the man having several masters, he is employed by a company set up by the three herd owners and engaged on a pre-set rota of relief milking. Work schedules can be arranged so that each

cowman and the relief man work five-day weeks for three weeks in every four (in the fourth they must work six days) and that they each have a three-day week-end once during the four week cycle.[1] On one-man farms this might be done without expansion but with some loss of income just to provide some regular time off for the farmer. However, in many situations, the expansion necessary to regain the 'break even' point would not be very great.

If one assumes that the cost of the relief man to the three farmers is £1,200 per annum and the average gross margin per cow is £80, only five more cows are necessary per herd to pay this wage. There may be problems over buildings, particularly for the smaller herds, but a bank of cheap kennels might be adequate and only one more cow would be necessary to provide for payments to add to the capital. In large units this might not be so important; indeed the herds might be set up, in the first place, to operate on this system and be of a suitable size to carry the wage of the extra man.

The principle of shared labour can be extended to the conservation programme where the availability of a gang makes for quicker and more timely conservation resulting in a better quality product. This may be difficult to assess in financial terms but, if coupled with a full syndication of the necessary equipment, it can lead to substantial savings in the power and machinery costs of the individual farms.

Joint use of equipment

A somewhat controversial project is the sharing of a milking parlour between a number of farmers. This arrangement appears to be particularly appropriate for smaller herds in those situations where a group of farmsteads are located in close proximity in a village. Often quite small expansions of these herds stretch the existing milking arrangements to their limits and force the farmers concerned to think of new parlour installations. A moderate sized milking parlour costs very little more than a small one and certainly the capital requirements of each farmer will be very much less if they agree to operate a parlour co-operatively. Modern methods of equipment cleaning and rapid cooling of milk in bulk tanks make it unnecessary for farmers to adhere rigidly to early morning and late afternoon milking times and, if needs be, the job can be spread over a much wider period. Nevertheless, with good organization a large number of cows can be milked through a parlour in two three-hour periods—say, 6.0–9.0 a.m. and 3.0–6.0 p.m. Initially, farmers would milk their own cows in an agreed succession but this should lead to an arrangement where they each take turns to milk all the cows. As a result they would all get regular relief periods from this very important chore.

Integration schemes

It would appear that considerable advantages could be obtained from full integration of dairy herds and the joint farming of the land involved. On larger farms this can be usefully extended to full scale co-operation in other enterprises making up the individual farm businesses.

The table on p. 175 shows in brief the financial situation before and after the integration of three small dairy farms. It assumes a situation where some

[1]See article by author in *Dairy Farmer*—July, 1968.

expansion of activities is required and where the farmers have specialized in milk production and decide to buy replacements rather than rear them. The farmers concerned realize that mutual assistance will make life considerably easier for them and will act as an insurance policy in the event of sickness.

Comparison of financial situation before and after the integration of three small dairy farms

	As individual farmers			After co-operation
	Farm A	*Farm B*	*Farm C*	*Group*
Acres	42	51	73	166
Cows	22	25	32	110
Dairy followers	8	10	24	—
Stocking rate	1·6	1·7	1·7	1·5
	£	£	£	£
Tenants' capital	3,390	4,500	5,780	20,205
Gross margins—Cows	94	97	94	96
„ —Replacement units	65	65	65	—
Total G.Ms ..	2,240	2,640	3,530	10,560
less: Forage variables	250	310	440	1,160
	1,990	2,330	3,090	9,400
Fixed costs ..	950	1,090	1,850	4,180
Net farm income	1,040	1,240	1,240	5,220
less: Farmers' own labour	700	700	700	2,100
Management and investment income	340	540	540	3,120
Return on capital	10%	12%	9%	15%

The material benefits are gained mostly from the expansion but there are also some from reduction in power and machinery costs (it is certain that there will already be a great deal of duplication of machinery) and the other overheads. The example shows an increase in fixed costs but this is due to additional equipment required for the expansion—mainly a new dairy unit.

It will be said that improvements on this scale could have been achieved by the individuals but, while this may be true, it could not be done with the same economy of investment. The grouping means, too, that there is a broader base for collateral for the necessary capital. Borrowing is easier under joint and several guarantee terms.

Such an integration will require careful organization to take into account the individual's problems and particularly in connection with the sharing of the profits. Where the partners are of equal standing, the sharing will be in relation to capital put in and work done but in situations where one partner is demonstrably more efficient than the others, his expertise must be acknowledged and a method of paying for it written into the initial memorandum of agreement. Unless this is done, the benefits to the less efficient partners can be very large, while the expert draws little or nothing more than he was obtaining on his own.

On some of the larger farms, it may be expedient to integrate the dairy herds and the farming of the grassland that goes with them while other enterprises are run individually. This does not necessarily involve the

'Cotel' system which, although it promises economies of scale, has all the attendant problems of fodder provision, muck disposal and limitations of land use. There may be more advantages from setting up a number of one-man units strategically placed to allow *in situ* use of grass during the summer months with a conventional winter fodder programme. This will allow grass to become an economical break crop and will probably cure the disease and other problems now associated with long cereal sequences.

The units can be geared to a five-day week system on the pattern suggested earlier in this article and the herdsmen can be given incentives to ensure high productivity. Such arrangements should also attract good quality men into the industry as it could be demonstrated that their wages and conditions could equal those achieved in other industries.

In many cases co-operation in the grassland programme will produce savings in equipment, capital and running costs. Because it will be possible to use bigger equipment with a pool of labour, there should be a bonus in production costs from better quality forage. Success in these operations will lead to the integration of other enterprises and ultimately into a fully integrated farm system. Individual farmers will be able to develop their particular skills for the benefit of the whole group or, alternatively, will delegate the day-to-day decisions to paid management while directing policy from the board.

Summary

While, in the near future, it is unlikely that there will be full co-operation by many groups of dairy farmers because of the problems associated with loss of individuality, there seems to be a logical sequence of activities all having an increasing benefit to the participating farmers. The first step, labour syndication, will ease the problem of seven-day week work and give the farmer time to think about his business or enjoy his leisure. This, followed by machinery syndication, should reduce capital needs and cut fixed costs, at the same time giving a production bonus from better quality forage. On smaller farms the joint use of a milking parlour and ancillary equipment may further reduce capital needs. Finally, varying degrees of integration of dairy herds, land work and other enterprises will give economies of scale, better conditions for agricultural workers and the opportunity for using the best expertise within the group for mutual benefit.

Grant aid is available under the Agricultural and Horticultural Co-operation Scheme for both marketing and production projects offering worthwhile improvements in profitability, but a pre-requisite is a substantial loss of individuality by members of the group. In considering co-operative activity, an injection of capital by such means should not be ignored. However, it is hoped that this article shows that benefits can be obtained from minor forms of co-operation which, if successful, can then lead to more ambitious operations attracting grant.

The author, **A. Lester-Card, N.D.A.,** is Regional Co-operation Adviser with the South-western Region of the N.A.A.S.

An article, 'Co-operation in the Beef Industry' appears on pages 186-189.

L. E. REEVE-SMITH

Secretary of the National Grocers' Federation discusses the role of the independent grocer in a series on farm produce and the retail market

The Changing Face of Retailing

DURING the last two decades the retail grocery industry has changed almost out of all recognition. The period has seen the advent of the self-service supermarket which many people forecast would spell the doom of the private grocer. This has not happened and today the independent grocer is fighting back and retaining a very sizeable proportion of the total grocery market.

The American influence on grocery retailing was first manifested in this country by the self-service stores of the early 1950s. These were usually branches of multiple organizations and at first were relatively small stores. The supermarket selling not only groceries, but fresh fruit and vegetables and meat, was the logical development of the self-service store, and this development has more recently been carried even further by the inclusion of cosmetics, hardware and clothing on the shelves of the largest supermarkets. In fact, judged by the wide variety of goods which are found in the supermarkets it could be argued that they are an up-to-date version of the general store, selling all those items of food, hardware and haberdashery associated for generations with the village shop!

During this period of development the independent retailer has changed as well, not so readily at first, but with increasing enthusiasm in recent years. Those who did not change—and there were many thousands—either because they lacked the financial backing or technical knowledge to stay the pace, went out of business. Those who survived fall into three main categories.

1. The convenience store or what the Americans call the 'Momma and Poppa' shop. This is often on a housing estate or in a village away from the competitive spirit of the urban high street and, although some people buy most of their requirements there, the majority use it as a convenient place to buy those odd items they forget to buy elsewhere; alternatively, it is used as a 'larder' by the type of housewife who buys as required and never has a weekly order.
2. The 'group' shop. The voluntary group is one of ways in which the private grocer meets competition from the multiple organizations. The most important type is the wholesale-sponsored voluntary group, organized by grocery wholesalers, many of whom saw their own existence threatened by the decline in numbers of the private grocer. These groups are in evidence in towns and villages and carry names like SPAR, MACE, VIVO, V.G. The other type is the retail group organized by the retailers themselves in much the same way as the agricultural co-operatives and now becoming more efficient by using

professional management. One such national group is 'BOB', but there are many other regional or local groups.

Both types of group allow the retailer to buy goods more cheaply by co-operative purchasing and also to attract the consumer by adopting the same marketing policies as the big multiples, even to the extent of selling 'own label' products.

3. The third type of store is the large successful independent, able to purchase goods in bulk and conduct his own promotional schemes without the assistance given by group wholesalers and usually successful because of the personality of the proprietor and the loyalty of local shoppers.

In addition, there are other independent grocers who are conducting successful businesses which do not fall into any of these categories, for example, operating specialist stores, such as delicatessens, or even mobile shops, taking a service to those areas lacking adequate shopping facilities.

As the independent adjusts his buying/selling techniques, his shop and his equipment is changing too. The old dark corner shop or village store is giving way to the bright modern stores, offering full or partial self-service facilities. At one time the 'corner grocer' was in the same category as the newsagent shop—one of the 'little businesses' so many people dreamed of buying for their retirement. These unhappy folk who took the step a few years ago figure prominently among the dismal procession back to 'Civvy Street'. Once the prime requirement in selling a grocer's shop was turnover related to profit but now this is only half the story; expansion potential is just as important a factor in a purchaser's calculations. A shop today with a turnover in excess of £1,000 a week can be classed as a good private business, but the expansion in our trade is so great that in a few years time those stores with this level of turnover could be virtually unsaleable if they are already operating at the maximum capacity.

Foreign travel has broadened the traditionally conservative British diet, and this is reflected on the shelves of the privately-owned grocers as well as the supermarkets. I live in a village on the Surrey/Berkshire/Hampshire border, with a population of only 2,000, but which boasts a delicatessen section in a very progressive independent store. Here the traditional village shop has given way to a self-service store selling such delicacies as caviar, rollmops, smoked salmon and *pâté de foie gras*. It is true that my particular village is at least 50 per cent 'immigrants', businessmen like myself who are refugees from the smoke of the cities, but the change is apparent in all areas, and in villages still largely serving the agricultural community, the group shop, the delicatessen and the self-service grocer are providing a valued service.

With all types of grocers, apart from the specialist store, the accent is moving away from commodity knowledge, the traditional requirement of the grocers, to the business management aspect, concerned more with modern management techniques, promotional expertise and above all financial control.

The selection of food and maintenance of a high quality is, however, still of paramount importance to the independent grocer. Moreover in many districts, especially the rural areas, the small grocer can offer a service which his larger competitors cannot match. For these reasons the efficient independent store-owner who is prepared to keep up with the changing times can face the future with optimism.

Farm Rents in 1968

THE Agricultural Land Service's enquiry in October, 1968, into farm rents in England and Wales found that since the previous annual enquiry in October, 1967, rents had risen on average by about 7 per cent. This is about the average rate of increase in recent years. The enquiry covered 3½ million acres, or about a quarter of the tenanted land in England and Wales. Average rents per acre of crops, grass and rough grazings were as follows:

Table 1

	October, 1967	*October, 1968*
	£ *s.*	£ *s.*
England	4 4	4 14
Wales	2 9	2 12
England and Wales	4 3	4 9

These averages conceal wide differences in the average rents of different areas. The variation between counties is shown on the map on page 180. The highest average rents are in the intensively farmed areas of Lincolnshire and Cambridgeshire, where some rents exceed £10 an acre, and in the grassland areas of the Cheshire plain. There is a concentration of higher than average rents in the Midlands and southern areas, while the lowest figures of £3 an acre and below are in the upland areas of the North and Wales.

Of those farms which had a rent change since October, 1967, 77 per cent had also had a rent change in the previous five years and 94 per cent in the previous eight years. Only two per cent of them had had no rent change since 1958.

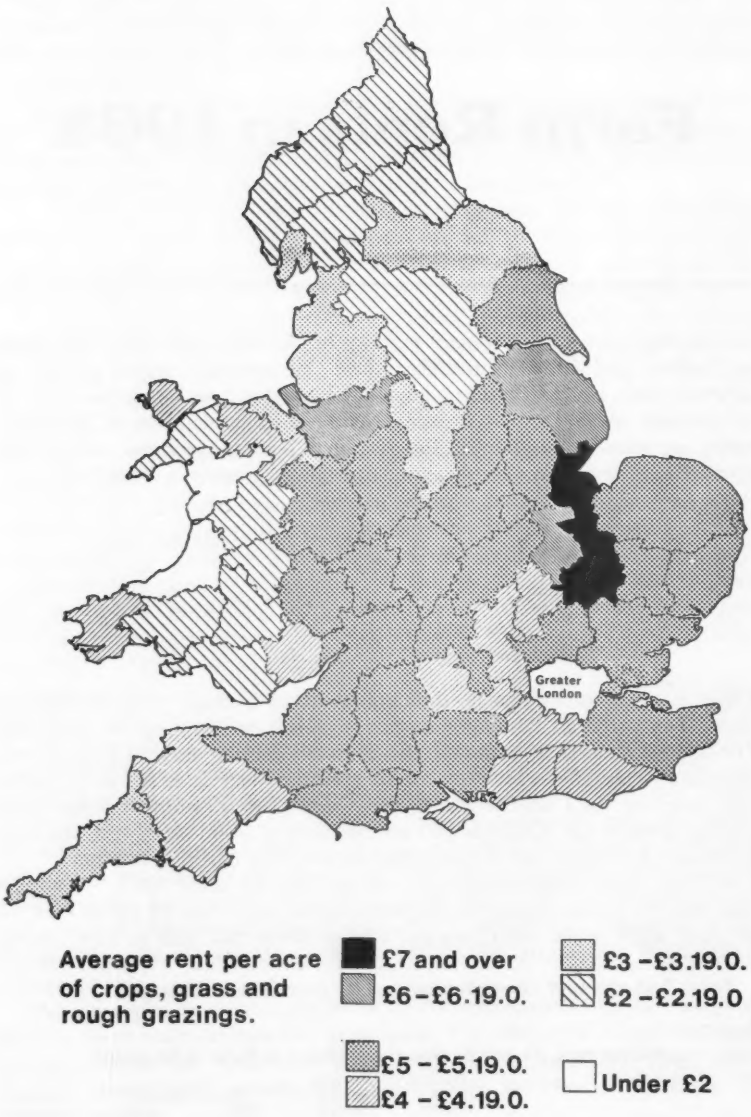
Table 2 shows rent changes analysed by type of rent change.

Table 2

Average rents per acre by type of rent change on farms in the enquiry

	Per cent of farms	Per cent of total acreage	Rent in October 1967 £ s.	Rent in October 1968 £ s.	Per cent change
New tenants					
by tender	0·4	0·5	3 6	6 14	+104
by agreement	2·1	2·3	4 1	5 10	+36
Sitting tenants					
by agreement	20·7	25·8	4 5	5 4	+23
by arbitration	0·1	0·2	4 0	5 13	+42
Total with change	23·3	28·8	4 4	5 5	+25
" no change	76·7	71·2	4 3	4 3	—
	100·0	100·0	4 3	4 9	+7·1

Average County Rent Levels, 1968.



Both the level of new rents and the percentage change from the 1967 figures vary appreciably according to the method of fixing them. The highest rents and the largest per cent increase in rents are as in the past, in the relatively minor category, new tenants by tender. The proportion of farms with a rent increase since October, 1967, (23·3 per cent) was higher than in

recent years but their percentage increase in rents (25 per cent) was slightly lower. Regional variations in new rents are set out in the table below.

Table 3

Average rent per acre in October, 1968, on farms with a rent change since October, 1967 (New Rents)

Region	Rents agreed with a new tenant*			Rents agreed with a sitting tenant		
	Average size of farm (*acres of crops, grass and rough grazing*)	Average rent	% increase over previous year	Average size of farm (*acres of crops, grass and rough grazing*)	Average rent	% increase over previous year
		£ s.	%		£ s.	%
Eastern	244	6 13	32	265	6 5	20
South Eastern	211	6 13	28	227	5 10	20
West Midland	303	6 14	51	238	5 17	30
East Midland	143	6 15	51	164	6 4	20
South West	167	5 15	51	212	5 0	19
Northern	272	3 6	20	258	3 10	25
Yorkshire/Lancashire	140	4 17	52	186	4 13	23
England	195	5 15	35	217	5 6	23
Wales	108	3 8	51	109	3 16	27
England and Wales	177	5 10	37	204	5 4	22

*Excludes new rents by tender.

The average new rent fixed in 1968 was £5 5*s.* per acre. This figure hides wide variations between individual farms and the average of all new rents by county varies from over £10 per acre in parts of Lincolnshire to less than £2 per acre in hill areas in Wales.

The Ministry's Publications

Since the list published in the March, 1969, issue of *Agriculture* (p. 154) the following publications have been issued.

MAJOR PUBLICATIONS

Agricultural Land Rights and Obligations of Landlords and Tenants in England and Wales. (Revised) 3*s.* 6*d.* (by post 3*s.* 10*d.*)

Experimental Husbandry Farms and Experimental Horticulture Stations. 9th Progress Report. (New) 10*s.* 6*d.* (by post 11*s.* 2*d.*)

Experimental Horticulture No. 19. (New) 10*s.* 6*d.* (by post 11*s.* 2*d.*)

Farm as a Business—Aids to Management No. 5. (Revised) 2*s.* 6*d.* (by post 2*s.* 10*d.*)

FIXED EQUIPMENT OF THE FARM LEAFLETS

No. 3. Farm Dairies (Revised) 2*s.* (by post 2*s.* 4*d.*)

No. 15. Shelter Belts for Farmland (Revised) 5*s.* 6*d.* (by post 5*s.* 10*d*)

No. 17. Preservation of Timber and Metal (Revised) 4*s.* (by post 4*s.* 4*d.*)

FREE ISSUES

ADVISORY LEAFLETS

No. 227. Mangels and Fodder Beet (Revised)

No. 486. The Pollination of Cherries (Revised)

The priced publications are obtainable from Government Bookshops (addresses on p. 202) or through any bookseller. Single copies of the above free items are obtainable from the Ministry (Publications), Tolcarne Drive, Pinner, Middlesex.

New construction of watercress beds

Watercress Growing in Hertfordshire

T. Whitehead

THE history of agriculture contains many instances of exploitation of natural resources to commercial advantage. Not less than any is the development of watercress production in Hertfordshire.

Abundant supplies of clean water are essential for the satisfactory growth of watercress; 300–500 thousand gallons per acre of beds per day are advised.* Whereas both Chalk and Greensand formations are suitable sources of supply, most of the principal areas have developed on watercourses, issuing or draining from Chalk strata. A scrutiny of the sketch map on page 183, therefore, shows clearly why the production of watercress in Hertfordshire increased so rapidly from natural trial areas in 1840 to a peak of around 120 acres a hundred years later, under the stimulus of consumer demand.

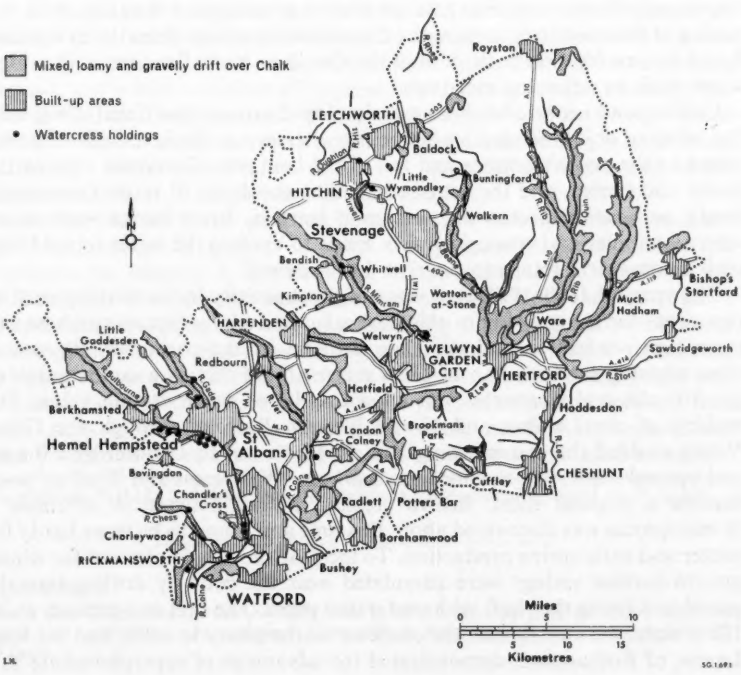
It will be seen that Hertfordshire is 'blessed' with numerous rivers draining mainly from the chalk regions of the Chiltern Plateau to the west and north-west of the country. Many of these are beautifully clear trout streams, unpolluted by urbanization and running through broad valleys where the

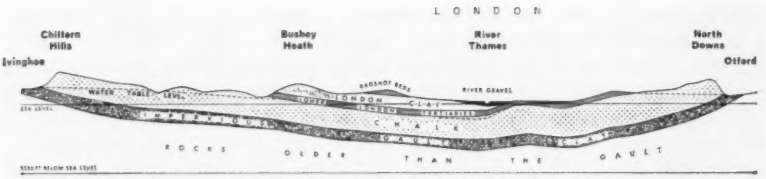
**Watercress growing*. Bulletin 136.

chalk strata lies near the surface, under a shallow layer of mixed loam and gravel. Plentiful river drainage water has, however, not been the sole factor in the establishment of the watercress industry in the county, now totalling around £200,000 gross annual value. The geological section, sketch on page 184, across the lower Thames Valley shows part of the vast underground reservoir in the Upper Chalk strata which extends with variable thickness; up to 250 ft have been recorded, under the greater part of the county, appearing at the surface in many places in the north near the border with Cambridgeshire. The collecting area for this reservoir obviously extends far beyond the county boundary. In the valleys where the chalk lies near the surface, natural springs have emerged through the shallow drift to supplement surface drainage. There are, therefore, many riverside areas in Hertfordshire with two sources of water suitable for watercress growing of which the early pioneers soon took advantage. The clean streams which drain from the chalk uplands, or chalky boulder clay, were found to be satisfactory for summer and autumn crops, with spring and bore hole water virtually on tap at a fairly constant temperature of 50–52°F affording some frost protection for winter and early spring crops.

Watercress production areas

Hertfordshire





Early records tell of the gathering of watercress, believed to have been *Barbarea vulgaris* at the beginning of the nineteenth century, but the first commercial planting of watercress, *Nasturtium officinale* was by a Mr. Bradbury in 1840. Having insufficient from his natural supplies for the increasing demand from London, permission was obtained to plant in water ditches alongside the River Chess at West Hyde on the Buckinghamshire border. The rapid expansion of the industry during the next 50 years followed the familiar pattern of enterprising workers setting up business on their own account after acquiring the basic knowledge of the art from their masters—the innovators. Among the first of these were the Sansom family who planted in spring ditches along the River Gade at Hemel Hempstead, by the River Bulbourne at Boxmoor and Berkhamsted, and near the River Ver at Redbourne and Gorhambury. In the year 1880 the Sansoms were gathering from 36 acres of beds along various rivers from Markyate to Uxbridge. Other enterprising growers planted along the River Bulbourne at Chaulden and Bourne End.

The utilization of the River Bulbourne for the Grand Union Canal had an important influence on the expansion of cress growing in this valley. With the raising of the main river to form the Canal, local drainage from the Tring Gap found its new level on both sides of the Canal, as a smaller river with a high water table in adjoining meadows.

Cultivation in controlled beds was developed around this time (1890), with the primary object of making better use of riverside ditches. Beds of a size suited to the available water and fall of the land were fashioned with earth-banks and timber, and the art of controlling the depth of water for cultural needs, or weather protection, was soon learned. River banks were raised where necessary and strategic sluices made to control the water to the beds, with a convenient return to the river lower down.

The years of 1890–1914 were years of great activity in the development of new areas for the growing of this new salad and many factors combined to encourage production and stimulate demand by the consumer. Physicians were advising the inclusion of fresh greens in the diet as a contribution to good health and watercress was shown to be of good vitamin value. The making of the London and North Western Railway through the Colne Valley enabled the first morning 'cut' to be on rail to London by 6.0 a.m. and opened the way to the northern markets. 'Watercress and Winkles' soon became a popular meal. Brown cress, a hybrid between *N officinale x N microphylla* was discovered about this time and found to be more hardy for winter and early spring production. To increase the supply of water for winter growth surface springs were stimulated near the beds by drilling into the gravel and lining the shaft with perforated pipes. The first two artisian wells, 120 ft deep, were made into the chalk at Gorhambury in 1890; and Sir John Lawes, of Rothamsted, demonstrated the advantage of superphosphate as a

fertilizer to improve the growth in late winter and spring. Perhaps the most important factor, however, was that work in watercress was looked on favourably by the farm labourer, compared with his more meagre earnings on the land.

The peak of production around 1948 coincided with the appearance of Crook root disease which almost wiped out the brown variety, resulting in considerable loss of supplies to the markets; and probably some loss of taste by the new post-war generation. Other strains of 'green' cress, either from France or of local selections have only partly filled the gap in early spring supplies, whilst glasshouse and imported lettuce has been readily accepted as an alternative salad.

The total acreage in the county was, however, maintained at 120 until around 1954 when increasing industrialization required increased water extraction from the chalk. Lowering of the water table caused many springs to dry up completely while others have to be assisted by electric pumping to produce sufficient water for the beds. The decline in recent years to around 75 acres can, therefore, be attributed to some reverse of the factors which stimulated its expansion. Loss of favourable water supplies, reduction of winter and spring cropping and the movement of workers to more attractive urban occupations. As with other branches of horticulture, however, there has emerged a number of growers with the same original pioneering spirit, to reorganize production, and through the application of successful business management are meeting the challenge of changing economic circumstances.

The N.F.U. Watercress Branch was started in Hertfordshire in 1926 mainly by the instigation of Mr. C. H. Sansom of Rickmansworth, subsequently becoming a national body with members throughout the country. It is a vitally active organization dealing with the main problems of its members particularly those of publicity for promoting consumer interest in this salad; it concerns itself with water supply rights, cultural research and, not least, sets a high standard of hygiene in production and marketing. Mr. Sansom was its Chairman until 1961 and the members from Hertfordshire with their wisdom and long experience have figured influentially in its policies. The N.F.U. Watercress Branch with over 100 members is centred on St. Albans with Mr. H. F. Barker as National Secretary.

A further chapter in co-operation began in 1964 with the formation of the West Hertfordshire Watercress Growers Co-operative at Hemel Hempstead by Messrs. H. Burgess, J. Knowles and W. T. Williams and Messrs. King and Garment. Considerable assistance was obtained from the Agricultural Co-operative Association by way of a feasibility study of the economics and business potential of group marketing as a result of which a substantial packing shed was erected, complete with refrigerated hydro-cooling tank and cold storage compartments. After only three years of operation produce from fifteen acres of beds is being packed for many markets throughout the country where its brand name 'Four Seasons' now commands great respect.

T. Whitehead, N.D.H., is a Horticultural Adviser in the Eastern Region of the N.A.A.S.

Further Reading

Bulletin 136, *Watercress Growing*—H.M.S.O. price 5*s.* 6*d.* (by post 5*s.* 11*d.*), contains chapters on cultivations; propagation; harvesting and marketing; weed control; diseases and pests.

A group of graded and weighed suckled calves drawn from five farms for sale on a 'farmer to farmer' basis

Co-operation in the Beef Industry

J. White

'In a fragmented production system in which some producers breed, others rear and yet others fatten, the necessary information required for any improved programme is extremely difficult to obtain and act upon.' (Produce Studies Limited—a report on *The Marketing of Store Stock*.)

This comment summarizes the general situation in the beef production chain today and underlines one of the main problems of the beef sector.

All too often the auction or dealer system of stock marketing discourages contact between the links in the chain, and the sale ring becomes a battle of wits rather than a meeting ground for farmers with a mutual interest in an end product.

Co-operative Marketing

The principal objective behind the development of co-operative calf, store or fatstock marketing groups should be to overcome this situation and not simply for the commonly expressed motives of 'bargaining from strength',

'premium prices', or 'reducing marketing costs', etc. Co-operative marketing alone will not make the cattle more valuable, nor can it be efficiently carried out at much less cost than traditional sales outlets. It will not protect the farmer from long-term market fluctuations as no feeder can afford to pay a large enough premium for co-operatively-marketed stores for it to have any significant effect on the income of the rearer, and the housewife will certainly not pay a disproportionately high price in the shops for red meat. In practice the group will stand, or fall, by the degree to which it streamlines the flow of meat from birth to the consumer and encourages the production of a first-class carcass with market appeal at a realistic cost.

Modest premiums of 1*d.* and 2*d.* per lb may eventually be achieved but only after the consumers' preferences have been fully established and translated into practice on the farm. Even so, significant benefit to the producer is more likely to accrue from the number of animals he produces of the required specification than the price obtained for each one.

Successful stock marketing groups have not found it to be in the interest of their members to operate on long-term contract prices. Current prices must bear some relation to the prevailing weekly market prices—where this has not been the case, it has proved too great a test of loyalty on either side. Although forward contract prices based upon the Ministry's standard weekly price would appear, at first sight, to be a viable proposition, sudden scarcity of stock, e.g., caused by export demands, makes this basis unrealistic. The group has the utmost difficulty, on the one hand, in satisfying its members that they are selling in the best possible market and, on the other hand, in maintaining contact with its long-term customers in the face of market fluctuations.

The group must accept that the buyer will, in the long run, call the tune. The aim must be to find the best market for members' stock and to follow up the sales with the object of ensuring that any subsequent criticisms which purchasers may have are taken into account in future production policy. All too often this 'after sales service' is ignored and the co-operative group does no more than find an appropriate market for the type of stock which happens to be presented in a particular week. This type of group, which simply offers a sales service, is serving the same rôle as the traditional outlets and the final result is unlikely to improve the lot of its members.

The group management must be strong enough to impose sufficient discipline on the membership to gain the confidence of the buyer and tactful enough to influence the future production policy of the members. It is all too easy for the group to allow this side of its activities to abate and if it does so it is likely to be overtaken by events in the future.

The finances of the group should be on a realistic basis from the start—voluntary service is not a long-term proposition and members acting as grader, secretary, etc., should be paid for their time and efforts. If potential members are not prepared to pay a realistic marketing levy and are more concerned with saving 10*s.* on marketing costs they are not really ready for a co-operative group.

The auction ring

The auction system is not necessarily incompatible with this marketing ideal and, indeed, can fulfil a valuable rôle for the store stock producer. A well-known example of this is the Brecon and Radnor Single Suckle Calf Association. This Association is run by a committee of farmers who, with the

co-operation of the auctioneers, run a series of auction sales. In three consecutive days at markets within a 25 mile radius of each other 8–9,000 store cattle are sold each year. The committee is very active in following up the sales which are made and encouraging a policy of stock production which will enhance the reputation of the Association. The quality requirement for acceptance in the sale ring is quite high.

The size and organization of these sales attracts an adequate number of buyers and the Association's efforts ensure their annual return. As an example, market research among the buyers indicated that the ideal lot going through the ring would be in the region of 10–12 calves, but it was not possible for individual farmers to enter evenly graded lots of this size. In fact, if the grading standards required by the buyers were to be accepted, the average lot size would be no more than two or three stores. As a result, a trial group of farmers within the Association agreed to pool their calves before the sales and to grade them into larger groups for presentation within the ring. Each lot thus consisted of calves from two or three farms so enabling a group of 10–12 calves to be put through the ring as a single lot. In the 1967 sales, buyers showed their appreciation of this arrangement to the extent of 6*s.* to 7*s.* 6*d.* per cwt.

Thus, where there is a large enough number of stock to attract buyers from a wide field and the auction facilities are sufficient to enable this to be carried out on the scale of the Brecon and Radnor sales, the auction system can probably gain the best of both worlds by combining its marketing principles with those of a forward-looking association whose interests extend beyond the ring.

Co-operative production

Co-operative beef production immediately suggests large beef lots—probably owned jointly by store producers and fatteners. However, at the present level of profitability, it is difficult for beef production to show a sufficiently high gross margin from graded cattle to cover the expense of specialist labour and machinery, and newly-constructed buildings under co-operative ownership. In a given set of conditions this may perhaps be achieved but the following factors are working against the possibility:

1. Little 'economy of scale' can be obtained by increasing the size of a beef unit since, applied to farming, this boils down to the better use of labour and machinery, and neither of these constitutes a high proportion of the costs of beef production. In fact, on the individual farm yarded beef is usually looked after by non-specialist labour which forms part of the fixed costs of running the farm, and the only specific labour charge is overtime for week-end feeding. In the specialist beef lot it is difficult to reduce labour costs much below £2 per head.
2. After incurring the expense of buildings and specialist labour, it is difficult for the unit to 'wax and wane' in the face of fluctuating calf and beef prices as would a farmer's individual unit. The buildings must be full to keep labour and other overhead costs down to an acceptable level per head.
3. The profitability of beef production is considerably affected by unpredictable factors—a fall of 5*s.* per cwt in the price of stores bought into the unit or a growth rate of 2¼ lb per day instead of a budgeted 2 lb can make a 25–30 per cent difference on the return to capital.

In consideration of a co-operative feed lot these points must be taken into account before arriving at a conclusion.

Occasionally, motives other than direct profit may prevail—a group of single-suckle calf producers with a proportion of late-born calves in poor demand at the autumn sales may be attracted by the idea of winter housing their stock co-operatively before a sale in the spring. Even though the profit from doing this may not be great it could help to stabilize the market in the autumn. However, the individual should still consider whether he would not be able to do this more easily on his own farm, or perhaps by moving the stock to other accommodation he will be able to free his own restricted building accommodation for more beef cows.

A more clear-cut case can be made for less ambitious forms of co-operation in beef production. Better bulls, weighing syndicates, the improvement of common hill grazing and silage-making etc., are all operations which can be carried out jointly with obvious advantage, but which stop short of co-operation in the actual production of the beef animal.

Perhaps the most likely area for the development of co-operatively owned groups of cattle is at the beginning of the production chain—the beef cow herd. Many hill grazings are understocked with cattle due to shortage of capital and winter accommodation and both are hurdles which may be more easily overcome co-operatively than by the individual.

It is becoming increasingly difficult to generate the capital needed for expansion from the existing farm business and there is little doubt that a legally constituted group of farmers is more likely to attract support from the bank than would the individual members. In this way, and with possible help from the Central Council for Agricultural and Horticultural Co-operation, it may be possible to achieve a more realistic level of stocking with beef cows in many hill areas.

The difficulty of winter keep and accommodation is an obvious case for joint consideration by hill and lowland farmers. These farms are undoubtedly complementary, as has been demonstrated by farmers with sufficient capital to take land in both areas. Once again, by working co-operatively, this advantage may be shared by smaller farmers whose individual financial resources prevent them from doing so.

Conclusion

There is an enormous task ahead for beef producers in streamlining their industry and ensuring that all stages of production are aimed at producing a carcass which will meet the consumers' precise requirements and at the same time show an acceptable profit to the farmer. Co-operative marketing groups will make a realistic contribution in this development only if they pursue the policy of taking note of customer reaction and passing the information back to the individual producers concerned. Their task must be to indicate to the member the methods of production most suited both to his farm and the appropriate outlet for his stock.

J. White, N.D.A., is Regional Adviser in Co-operation and Marketing for the N.A.A.S. in Wales.

Change-over to Mechanical Harvesting of Brussels Sprouts

Andrew Brown

NEARLY 40,000 acres of Brussels sprouts are grown in Britain producing up to 150,000 tons of sprouts annually and involving at present a harvesting cost of nearly £2 million.

Almost 90 per cent of the sprouts are at present hand-picked in the field during the months from October to March, often under very unpleasant conditions. It is, therefore, not surprising that each year pickers are more difficult to find and that those that are available make increasing demands for greater rewards for their labour.

The possibility of mechanically harvesting this crop has attracted a great deal of interest from the growers and from the manufacturers of harvesting machinery. Available systems of mechanical harvesting means a once-over or a single-harvest system, a system that if practised with sprouts which are grown in the traditional way for the wholesale market would result in yields unacceptable economically.

Most of the Ashwell type of sprouts are grown in the Bedfordshire area, where one finds the largest concentration of Brussels sprouts in the world, and where growers have selected material to pick over as long a season as possible from September until March. These sprouts are normally grown at a yard square.

Fortunately, the demands of the processors for small sprouts for freezing brought about a programme of research and experimental work at the

National Vegetable Research Station, Wellesbourne, and on a number of the experimental stations, aimed at trying to produce a maximum yield of small sprouts at a once-over single harvest. These results showed conclusively that high yields were possible by using closer spacings, and that by picking out the growing point (stopping) it was possible to obtain optimum yields at a given harvest date. These research and experimental results have more recently been applied to the larger sprout required by the pre-packer and on the wholesale markets.

Many of the recently introduced continental varieties of Brussels sprouts have responded to the closer spacings and to the stopping treatment, resulting in very high yields, up to 8 tons per acre being obtained from a number of these mid-season varieties.

It was with this information that a continuity study started on a number of the experimental horticulture stations with the object of producing a programme comprising early, mid-season and late varieties all grown at a spacing of 21 × 21 inches. Programmes are already available that should ensure an average yield of 4–5 tons per acre of sprouts over a period from the end of August until mid-February.

The yield per acre with the varieties at present available is not constant over this period and will start with approximately 1½ tons per acre at the end of August, rising to 8 tons per acre in November and falling to approximately 3 tons per acre in February/March. By varying the area grown for harvesting at different times in the season, growers can get reasonably good control of the volumes to be picked. It is harder to estimate the amount of wastage in February and March than to time maturity up to Christmas.

Stripping machines

At the same time as the experimental work was being done to produce sprouts for single harvesting, the prototype of the first British stripper was being developed by workers at the Scottish Horticultural Research Institute at Mylnfield in Scotland. This machine has since been further developed and marketed by P. J. Edmonds Ltd., Itchen, Abbas, Hampshire.

Workers at the Institute of Horticultural Plant Breeding (I.V.T.) at Wageningen in Holland also produced the prototype of the Dokex stripper now marketed by Barretts Ltd., Boston, Lincolnshire.

The first commercial machines produced were used, and still are, as static units in the grading and packing line. These machines only remove the sprouts from the stem so that deleafing has to be done in the field before cutting off, loading and carting to a shed.

Description of machines

With the Edmonds Stripper the stems of the Brussels sprouts are pushed growing tip first into one of the two rotating hole saws to pre-strip the top three to four inches of sprouts before being pushed into the stripping hole. The stem is gripped between two driven cage wheels which are held against the stem by spring pressure. The wheels pull the stem through the stripping hole, breaking the sprouts off against a tufnel facing. The sprouts drop down into a shute on their way to the grader.

The Dokex comprises four knives which are mounted on a revolving disc and constrained by springs towards the centre. The disc has a hole in the

middle large enough to allow the thickest sprout stem to pass through. To operate the machine a foot pedal is pressed down, operating a brake which causes the knives to open and to stop revolving. The stem, either the top or bottom end, is inserted between the knives until it is gripped by two springloaded ribbed rollers that are responsible for pulling the stem between the knives and which close round the stem when the foot pedal is released. These knives rotate, slicing off the sprouts. The quality of the produce as stripped is similar with both machines.

Between 500 and 600 stems per hour, producing approximately 6 cwt of sprouts, can be stripped by these machines compared with the rate of a skilled sprout picker in the field who will pick between $\frac{3}{4}$ and $1\frac{1}{4}$ cwt of sprouts per hour.

A third sprout stripper, the Bruff, has recently been introduced and is to be marketed by the Bruff Engineering Co. Ltd., Suckley, Worcestershire. This machine consists of stationary knives mounted around the internal diameter of a circular orifice resembling an iris. The diameter of the circular orifice is altered by moving the spring-loaded overlapping knives with a foot-operated pedal.

During work the stripping knives are vibrated; the frequency of vibration can be adjusted to suit the crop. To operate, a Brussels sprout stem is inserted in the opened orifice (which, when released, close round the stem) until it is gripped by two spring-loaded rollers which pull the stem between the vibrating knives.

There are no work rates so far for this machine, and it is suggested that there should be a three-year write-off period during the present stage of development.

Handling systems

The system that involves moving the stems from the field to the packhouse is probably acceptable when the distance between field and packhouse is short. Often, however, fields are long distances from the packing shed, especially in the case of members of co-operatives where the carting of 50 per cent waste material over long distances, although possibly economical, can produce organizational problems. With this in mind, the stripper operating in the field or in a mobile packing shed set out on the headland to which the stems are carted, and where a few workers can operate a stripping machine, enables the waste to be left in the field. Workers at the National Institute of Agricultural Engineering, Silsoe, Bedfordshire, are developing such a mobile unit.

The alternative is possibly a stripper mounted on a low trailer which is towed by a tractor alongside the crop, thereby allowing workers to cut the stems and to push them through the strippers.

Combine harvester

I believe, however, that the systems discussed above are only filling a temporary gap until we see a complete Brussels sprout combine harvester.

During the past season we have seen a Dokex sprout combine in the field, a Dutch machine made in two sections, a cutter elevator side-mounted on the tractor, and the trailing harvester itself comprising conveyor, three Dokex sprout strippers, leaf separators, sprout conveyor and bagging heads and platform.

This combine harvester is designed for single-row working and has a claimed work rate of up to 2 acres per day or approximately 2,400 stems per hour. It is manned by six operators comprising the tractor driver, three stripper operators, one man bagging off and one guiding the sprout stems between the knives of the cutter.

The sprout stems are cut by a revolving saw and are then elevated on to the conveyor where they are manually picked off and fed into the strippers, which are fitted with leaf separators. One of the problems so far encountered with this machine has been the difficulty in operating on the typical heavy land on which most of the sprout crop is at present grown, particularly during the after-Christmas period.

Requirements of material for mechanical stripping

All the work done so far on the mechanical stripping of sprouts from the stem has highlighted the need for the uniformity of the sprouts and of the stems.

Any machine can only have certain design tolerances built in if it is going to work with reasonable efficiency on the majority of the stems. The variable material at present being used means that many stems get badly damaged when stripped or fail to strip at all. The main requirements are, therefore, uniform habit, straight, strong, long stems (a minimum of 2 feet in length) allowing the machine to be used to its maximum efficiency. Best results are obtained when the individual sprouts are not touching each other on the stem.

Oval to round sprouts with $\frac{1}{4}$–$\frac{1}{2}$ inch of butt which can be removed on trimming without excessive sprout leaves falling off, and a uniform butt length, would be very valuable characteristics.

Producing material with the required characteristics are problems for the plant breeder. New hybrids are already available and each successive season sees more and more being introduced. Unfortunately, most of these new varieties are mid-season. There is a desperate need for hybrids that will produce the bulk of their crop during the period from Christmas onward, also for early maturing hybrids to replace the squat early variety Early Half Tall that is at present unsuitable for machine stripping.

One outstanding after-Christmas variety (for machine stripping) is Seven Hills, a Dutch variety. When the sprouts are removed from the stem it is difficult to recognize them from trimmed sprouts. Seven Hills is not a hybrid and so lacks uniformity, but it does possess characteristics that should be of interest to the plant breeder.

It is clear that to obtain the uniformity of material essential to allow any machine to work efficiently and economically the varieties of the future must be hybrids.

This article has been contributed by **Andrew Brown, D.H.E., Dip. Hort.**, Assistant Regional Vegetable Specialist, N.A.A.S., Cambridge.

Tests on Tractor Safety Frames and Cabs

After September, 1970, all new tractors must be fitted with approved safety frames or cabs when sold or let on hire for use in agriculture (The Agricultural (Tractor Cabs) Regulation, 1967, Statutory Instrument No. 1072, Agricultural Employment—Safety, Health and Welfare).

22. North Hertfordshire

D. M. O. Jones-Davies

THE district stretches from Lilley in the west, bordering Bedfordshire, to Bishops Stortford in the east on the Essex boundary, a distance of approximately thirty miles. North and south the distance is slightly less, being bounded by the parish of Langley in the south, and Royston, on the Cambridgeshire border, in the north.

Hertfordshire is well known for its large variety of soils which is a typical feature of the northern district. This adds to the problems of the farmer and the adviser, especially in the west of the district where the soils vary from thin chalks and gravels, through the light loams, to the medium and heavy loams. Add to these the silty clays, heavy clays, clays with flints, and occasional outcrops of fen-like peat, and one can see the vast range of soil types and conditions that prevail.

Not only will individual farms have two, three or more types of soil but it is quite common to find this same variation within a single field, thereby making cultivations and seedbed preparation more difficult and necessitating constant adjustment to implements while working the land.

Likewise, manuring on some fields can cause even bigger headaches since the strongly contrasting soil types within a field have a completely differing natural level of plant foods. In ascertaining lime requirements the appreciation of this variation is fundamental, and will frequently entail building up a 'calcium map' of a field, before giving advice on lime requirements. Bulking of samples under such conditions would be fatal as it is often necessary only to lime an acre or two, or perhaps half a field, since the other part could well predominate with 'free' chalk.

As with the rest of the country, economic conditions are playing a greater part than ever before in the pattern of Hertfordshire agriculture. Farmers are being increasingly forced to consider the inherent assets of their farms and then to develop these natural resources to the full, rather than follow a particular system in which they are most interested. In this respect many dairy herds on the heavier soils have been sold, whereas those on the lighter, freer, draining soils have tended to expand, and one finds many farmers beginning to think and act in terms of 100 cows plus, while the smaller herds of twenty to thirty cows are fast disappearing.

Fattening cattle have diminished considerably over recent years, and are becoming confined to those farms that have a certain area of land unsuited to the plough due to difficult drainage, excessive undulation or parkland adjoining or being part of the holding. Under such conditions, many farm

buildings are standing empty, and must eventually give way to the bulldozer and possibly the erection of more modern buildings designed for easier handling of larger numbers of stock than was thought possible a few years ago. Before this change comes about, such projects will need a large injection of new capital from which a reasonable financial return must be seen.

Changing economic conditions have likewise forced a change in cropping patterns of most farms. The once predominant one-year ley of Italian ryegrass and/or clover, cut for hay and then broken up as a preparation for winter wheat, and as a means of cleaning up a weedy field, is becoming a thing of the past, because its cash returns are so uncertain and generally at too low a level.

Potatoes and sugar beet are becoming specialized crops, being confined to the more productive soils and to such farmers who are prepared to equip themselves in the newer techniques of production that such crops require in a competitive market; added to which extra capital is required for up-to-date machinery and fixed equipment.

Brussels sprouts which, like potatoes and sugar beet, are regarded as a good cleaning crop, and were a feature of north Hertfordshire farming, are declining rapidly in acreage. This is due to the lowered returns of the market, brought about, no doubt, by the increased consumption of frozen and processed foods.

With the economic trends of these high cash crops, the natural reduction in the labour force, and the increasing development and use of machines for a variety of purposes, it is inevitable that the pattern of cropping is changing to a more simplified and streamlined system of cereals, beans and other break crops, many of which can be mechanically handled by equipment already on the farm.

It is interesting to note that with this change the county acreage of wheat over the last ten years has remained more or less static at about 48,000 acres. The released acreage has been sown mainly to barley which in the same time has increased over the county from about 57,000 acres to over 97,000. In more recent years, beans have claimed a fair increase in acreage, while in the immediate future, oats will be brought in to a greater extent to provide an additional break crop to continuous wheat and barley.

Drainage and 'ploughing dry' are two further essentials for the successful farming of the heavier lands of the district and, of these, drainage has tended to suffer in recent years, due to the scarcity of skilled operators and of specialized mechanical equipment.

In such a short survey of north Hertfordshire farming, it would be wrong not to mention the continuous demand for agricultural land for houses, roads and airports. Stevenage New Town within our midst has, and still is, swallowing up hundreds of acres. The Baldock and Stevenage by-passes, vital to modern transport, have displaced valuable acreages, and now we have the possible further development of Luton Airport with the consequent demand for housing, access roads and other amenities that go with such expansion. Such urban demands, however, merely seem to strengthen the the loyalty and dedication of those workers and farmers that remain true to their calling, and to whom their district adviser, over a comparatively long period of time, wishes to express his appreciation for the co-operation he has received from those with whom he has had the privilege and pleasure to work.

Season your Timber

T. V. Yabsley, *Agricultural Land Service, Exeter*

WITH the growing interest in low-cost buildings for the farm, it is natural that landowners and farmers often wonder whether they can make use of the supply of round timber from hedgerows, plantations, etc. usually available on most farms. Frequently it is possible to use such timber either in the round or converted for the erection of fencing, providing supports for sheds and barns and the fabrication of such things as mangers, racks, cattle crushes, hurdles and so on. Although there are a few species, the heartwood of which is durable, most round timber needs to be treated with preservative against decay before being put into use, in order to prolong its life. A necessary preliminary step to this treatment to secure the best results, is to ensure that the timber is well seasoned.

The purpose of seasoning is to remove surplus water and so bring the timber into equilibrium with the moisture content of the air likely to surround it in use. Not only will it enable preservatives to be applied effectively but it will:

1. Make the timber stable, preventing shrinkage and distortion.
2. Increase, up to 50 per cent in some cases, its mechanical properties, strength, stiffness, hardness, etc.
3. Make it lighter and therefore easier to handle.
4. Increase resistance to decay. The types of fungi which attack timber cannot operate at a low-moisture content; in fact, at a moisture content of 20 per cent or less timber is immune to fungal decay.
5. Improve its working qualities.

The process most likely to be suitable for farm purposes is air seasoning. This depends on air conditions so the rate of drying cannot be controlled to the extent that would be possible in the more scientific and complicated process of kiln seasoning. In preparing for seasoning, it is important to bear in mind that wood is hygroscopic (i.e., water loving) and so has the capacity to take up moisture from the air. Humidity of the atmosphere during the treatment period will therefore influence the rate of drying.

Seasoning should commence as soon as possible after the timber has been felled. A level site on which to stack the timber should be prepared making sure that it is well drained and clear of all grass and weeds, etc. If possible, a covering of ashes or other suitable material should be provided. The stack

should be approximately 6 ft in width with a length to suit the timber to be seasoned. Safety factors will control the height of the stack, but generally 8–10 ft will be found suitable. A firm foundation is essential and may be constructed of brick or concrete piers, 12–18 in. high at 2 ft centres with cross members of 4 × 4 in. timbers. It is desirable that the stack should be roofed to protect it from the weather but the sides should be left open so that air can be circulated freely. Sheets of galvanized iron supported on a timber framework would be suitable for this purpose.

If the timber to be seasoned is in the round, the poles should first be trimmed, cut into suitable lengths and stripped of bark. The poles must then be cross stacked on the base. This means piling them 1 in. apart, with alternative rows at right angles to each other.

Converted timbers should be stacked with air spaces between each layer with piling sticks or 'stickers' between them. These 'stickers' should be approximately 1 × 1 in. in size and placed about 2 ft apart for softwoods (except larch) because softwoods in general do not distort in drying. For larch, oak, elm or beech the 'stickers' should be much closer together.

Different species and thicknesses should be stacked together, long, thin boards at the bottom progressing to short, thicker boards at the top. The exposed ends must be protected to prevent them drying quicker than the remainder of the board, since this would cause cracks or 'shakes'. Protection may be achieved by nailing wooden cleats across the ends or by painting them with a bitumastic or similar preservative. The latter method is both simple and effective and is to be preferred for farm purposes.

There is an inaccurate but widely held belief that trees felled in autumn or winter 'when the sap is down' contain less water. Scientific investigation has proved that this is not so; the water content in a tree remains fairly constant throughout the year. As mentioned previously timber should be prepared as soon as it is felled and seasoning should commence immediately. Nevertheless, the winter and spring is the best time to commence air seasoning so that the timber acclimatizes itself before the heat of summer.

There is also an old belief that it takes one year per inch of thickness to air season timber. As a rough guide, however, depending upon weather conditions, softwood 1 in. thick should reach 20 per cent moisture content in two or three months; 2 in. thick timber will take approximately six months to season.

These guides are rough and ready and do not take into account the fact that thick boards will not dry in the centre for many years. However, air seasoning is such a steady process that very little damage is encountered with the moisture at the centre of thicker timbers and they will eventually dry out to 20 per cent moisture content.

A farmer with access to a supply of round timber would be well advised to consider building his own stack. If he follows the lines described in this article he will have available a good supply of dry, seasoned timber for which he will find many uses in and around the holding.

Further reading

Fixed Equipment of the Farm Leaflet No. 42 *Round Timber from the Farm* contains further useful advice on this subject. Copies are available from Her Majesty's Stationery Office (addresses on p. 202) price 9*d.* (by post 1*s.* 1*d.*).

in brief

- **Vice in the piggery**
- **Food retailing**

Vice in the piggery

It seems that any one of a number of circumstantial factors can trigger off tail biting among pigs. It would not be fair to say that this vice was completely unknown say thirty or forty years ago when so much pig keeping practice hardly qualified to be described as husbandry, but there can be no question that the incidence of tail biting has grown markedly with the changes to modern methods. The immediate, and perhaps single, cause of an outbreak may well vary from farm to farm. Breeding may carry a genetic vicious strain in some animals (and this is certainly a factor worth watching for), but in the majority of cases it is man-made environment that is the more highly suspect.

Intensivism is inescapable under today's economic patterns of production, but it has raised many problems which have still to be resolved. In any given house of any given design there must be an optimum number of pigs per pen that reconciles profitability with health, ample room for them to move around and lie down, adequate ventilation free from draughts, the right temperature and the right humidity. Temperature means temperature *at pig level;* thermometers set at five to six feet above floor level give no indication of the conditions operating around the pigs. Cold, damp houses may now be assigned as things of the past, but at the other end of the scale high temperature with little or no air circulating through the house will equally cause discomfort. Where there is discomfort, stress will inevitably be built up and the manifestation of some vice will assuredly follow.

That, briefly, is the housing side of the problem. The overall aim is contentment. And in this connection we do well to look critically at the feeding side of the business. Dr. Sainsbury has pointed out that high protein, high energy diets are quickly assimilated, leaving the pigs with too much idle time between feeds, thus producing boredom and the vices by which they seek to relieve it.

'Fibre and roughage,' he says, 'may promote a more contented bowel with less tendency to the scouring and the 'stomach-ache' which often seem to be a prelude to vices. A bedding of straw or straw and shavings appears to be more than merely something to lie on'.

One 'bad hat' in a pen is enough to start a chain reaction, and therefore eternal vigilance is once again seen to be the first law of good stockmanship.

Food retailing

The metamorphosis of the retail market brought by the big battalions continues unabated. Less and less is shopping the quasi-social experience it once was. Self-service is now the accepted order of the day and may confidently be expected to increase. A survey* by the Dept. of Employment and Productivity shows the number of shops of all kinds giving self-service in all or part of the establishment to have increased from 3,900 to 17,000 between 1957 and 1965. It is forecast that by 1970 the number will have risen to about 28,000, including 3,400 supermarkets,

accounting for around 70 per cent of grocery trade sales; by 1980 there will probably be in the region of 30,000, of which 7,500 may be supermarkets.

With increasing self-service we can expect to see a trend towards bigger shops, providing, as they do, the conditions for greater productivity, a higher level of turnover per person employed and generally more profit. Board of Trade figures for 1961 showed the average turnover per person employed to have been about 30 per cent greater in self-service shops than in others.

Of all shops in retail trade in 1966 (some 500,000) nearly half are concerned with food, employing 38 per cent of the total labour force numbering over 2½ million. The survey is of particular significance in its analysis of the staffing and working pattern that will continue to emerge as a direct result of self-service. More young people and unskilled workers will be employed, with probably greater opportunities for part-time employment; and administrative, office work and transport will require a smaller proportion of the labour quotient.

The steady movement away from a close shopkeeper-customer relationship will doubtless be regretted by the older generation, but some counter-service will certainly be retained, and the small shop on the corner will still be in business. (See also articles on pages 165 and 177).

AGRIC

*Manpower Studies No. 8. H.M. Stationery Office. 4*s.* net. (by post 4*s.* 6*d.*)

National Institute of Agricultural Botany

Huntingdon Rd., Cambridge. Tel.: Cambridge (OCA3) 76381

At a recent meeting of the N.I.A.B. Council, Sir Harold Sanders was re-elected Chairman and Mr. Peter Cundy Vice-Chairman for the forthcoming year. The Director, Mr. Frank Horne, tendered his resignation to Council, to date from September, 1970 when he will reach the upper age limit. This was received with regret. Council approved the up-grading of Dr. Wellington from Assistant Director to Deputy Director.

Sir Norman Wright, Kt.C.B. will address the Annual General Meeting of Fellows to be held at Cambridge on Friday, 27 June. Sir Norman was Secretary of the British Association for the Advancement of Science until his retirement last year and was formerly Deputy Director-General, Food and Agriculture Organisation. There will be **Open Days at Cambridge on Thursday, 26th June when all crops will be demonstrated; Thursday 2nd October for root and fodder crops and Thursday 23rd October for vegetables.**

Books

Rural Economy and Country Life in the Medieval West. GEORGES DUBY. Edward Arnold, 1968. 90*s*.

Western Europe is a large place and the Middle Ages were a very long period of history. Nevertheless, despite an infinity of differences of place and time, the varied communities of medieval Christendom had much in common. In particular, they all formed part of the most rural civilization the world has ever seen and they faced agricultural problems and opportunities with similar agricultural technologies.

In this comprehensive and detailed book, which Cynthia Postan has translated from the French, Professor Duby reduces to a coherent story the mass of evidence on *les grandeurs et servitudes agricoles* which changed the face of a continent and laid the foundations of the modern world.

His basic theme is the steady reclamation and settlement of the waste by lord and peasant which converted a great green wilderness into a 'fair field full of folk'. Sometimes too full, for famine and the fragmentation of holdings reflected the failure of agricultural production to keep pace with the growing population until the disaster of the Black Death. Against this background, he traces the fortunes of the large estate and the small farm, the development and decay of the manorial system and the rise of a peasant economy backed by urban finance. He tells this story partly as narrative, partly as quotations from contemporary documents, in which for a brief moment we glimpse individual men and women of the time and the vanished landscape in which they ploughed and reaped, felled timber and bargained over land, labour and food. The past is before us and we watch it change as we read.

Nevertheless, despite the clarity of its style and the analytical skill of its presentation, this is not a book for the layman. It is written with massive documentation by a scholar and will be read mainly by other scholars. But it is surely only a matter of time before the fascination of the material it contains attracts those who will make its contents, episode by episode, available to the general reader.

N.H.

Farming in the North of England. C. W. SCOTT. David Rendel, 1968. 35*s*.

This book is one of a series covering the farming in Britain, and is designed to provide 'the new entrant to the industry with a broad view of modern farming on which he can base his further education in agriculture'.

It is most suitable, too, for the general reader who loves our country, for here is a pen picture with all the basic essentials and no unnecessary detail, yet essentially readable from start to finish.

Few realize how much we owe to farmers for the beauty of the country scene. Scott's book takes us to new viewpoints which cannot fail to increase our pleasure as we travel through the countryside.

Farming types are well described, and the brief pen picture of the development of the livestock breeds and breeding are particularly interesting. The northern farmers are essentially livestock men and a few may be disappointed that no special mention is made of the local breeds of sheep, i.e., the Teeswaters, Dalesbreds and Bluefaced Leicesters.

Particularly good descriptions are given of the new science of genetics; of building and environment control; of marketing; and of recent developments of groups of farmers to share machines and knowledge; to buy, produce and sell collectively.

There are no sentimental undertones or overtones to this book. Fishing, hunting and shooting are all mentioned and so is the art of sheep-dog trials which is also one of the recreations of the countryside. No mention is made of hound trails nor of the domestic arts of the farmers' wives, so well displayed at local shows; nor is mention made of the wood and horn carving—an exhibition of the top work attracts enormous interest.

Many townsmen who read this book will be grateful to Mr. Scott for setting out such a readable contemporary picture of agriculture in the late 1960s.

The illustrations deserve special mention. They are excellent, well chosen and add considerably to the value of the book.

J.R.S.

Plant Breeding. WILLIAM J. C. LAWRENCE. Arnold, 1968. 14*s*. (paperback 8*s*. 6*d*.)

This is the twelfth of the studies in biology sponsored by the Institute of Biology and the Royal Society. Its primary purpose is to introduce plant breeding to advanced school pupils and university students who, it is assumed, will already have an elementary knowledge of genetic segregation and its underlying cytological mechanisms. However, even the specialized breeder will enjoy reading it, which is to be expected in view of the author's wide experience from the genetics and evolution of the Dahlia and Streptocarpus to potting composts and soil sterilization, in a lifetime's work at the John Innes Institution.

The emphasis is on genetic principles, which are discussed much more fully than might have been expected in a small book, with very carefully chosen examples from a wide range of agricultural and horticultural species. The contents are well organized with a useful table of contents referring to all the sections by number for easy reference. These sections cover the origin of cultivated plants, general breeding methods for inbreeding and outbreeding plants and the specialized methods involving incompatibility, male sterility, heterosis, mutation and polyploidy. There is also a most interesting chapter giving the current views on fitness, adaptability and the conservation of variability. *J.B.*

A Critical Review of Research in Land Economics. LEONARD A. SALTER. American University Publishers Group, 1968. 71*s*. 6*d*. (Paperback 25*s*.).

Inevitably, this book must be substantially the same as the first version which was published in 1948. Salter's untimely death has robbed him of any opportunity to revise his work in the light of post second world war developments. The only addition in the revised version is an introductory essay by Professor Kelso, who discusses the author's life and his attitude towards scientific research.

Salter's basic hypothesis is that much social science research carried out in the United States has suffered from the vague formulation of the problems studied and the inadequacies of the research procedures used. Before going on to substantiate this hypothesis, the author outlines the development of rural land economics in the United States up to 1944, and he also explores the meaning and implications of scientific method.

In order to test the adequacy of published research into land economics problems, Salter studied approximately 500 research bulletins, covering such topics as rural indebtedness, farm abandonment, tax delinquency, land values, owner-tenant relations, and the problems of cut-over areas. Some of these research reports are critically examined individually in the text, and attention is paid to the ways in which they fall short of the ideal prescription for social inquiry. From the reviews the author concludes that his initial hypothesis was correct and that if changes are made in land economics research procedures, then more productive results would be achieved.

The book is a worthwhile one for present-day readers for two reasons. Firstly, it provides an interesting historical account of work and thought in land economics up to 1944. Secondly, and more fundamentally, some of the lessons spelt out by Salter remain unlearnt by many social science research workers. For example, such defects as the use of statistics to prove *causal* relationships, the use of cross-sectional data to predict future trends, and the collection of data without due attention to the problem under discussion, can still be seen in present-day projects.

J.A.R.

books received

Animal Breeding Research Organisation. Report—January 1969. Agricultural Research Council. 6*s*. 6*d*.

Farm Management Notes. No. 38. University of Nottingham, 1968. 3*s*.

A Bibliography of Farm Buildings Research. Supplement for 1967. Agricultural Research Council. 25*s*.

Co-operation in Farm Production. G. H. Camamile. Agricultural Co-operative Association, 1968.

Animal Production. Twenty-fifth Anniversary, British Society of Animal Production 1944–69. February 1969. Vol. II. Part 1. Oliver and Boyd. 25*s*.

Plant Nematology in Africa South of the Sahara. P. R. Thomas and C. E. Taylor. Commonwealth Agricultural Bureaux, 1968. 60*s*.

Agricultural Chemicals Approval Scheme

Second List of Additions to the 1969 List of Approved Products for Farmers and Growers.

AMINOTRIAZOLE with DIURON
A foliar acting and soil residual herbicide for the control of annual and perennial weeds in established apples and pears.
Wettable Powders
Amizol-D—Marks

AMINOTRIAZOLE with DIURON and DALAPON
A foliar acting and soil residual herbicide for the control of annual and perennial weeds in established apples and pears.
Wettable Powders
Boots Orchard Weedkiller—Boots

CHLORBROMURON
A contact and residual herbicide for the control of annual weeds pre-emergence in potatoes.
Wettable Powders
Maloran—Baywood

DICAMBA
A selective herbicide for the control of bracken in forestry.
Amine Salt Formulations
Bracklene—Fisons

DICHLORPROP
Potassium Salt Formulations
Calagric 2, 4-DP—Calor Farm Services

DICHLORPROP with 2, 4-D
Amine Salt Formulations
Calagric 2, 4-DP + 2, 4-D—Calor Farm Services

DICHLORPROP with MCPA
Potassium and Sodium Salt Formulations
Calagric 2,4-DP + MCPA—Calor Farm Services

MCPA
Potassium and Sodium Salt Formulations
Calagric MCPA—Calor Farm Services

MECOPROP
Potassium and Sodium Salt Formulations
Calagric CMPP—Calor Farm Services

STREPTOMYCIN
Wettable Powders
Embamycin—May and Baker

Company Information

The following firm has recently joined the Agricultural Chemicals Approval Scheme:

Calor Farm Services Ltd.,
36 Higham Road,
Rushden,
Northants,
NN 10 9DB.
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